COASTAL CHRISTIAN SCHOOL

PROJECT MANUAL

FOR

NEW MULTI-PURPOSE, CLASSROOMS BUILDING
AND ASSOCIATED SITE WORK

1005 NORTH OAK PARK BOULEVARD
PISMO BEACH, CALIFORNIA 93449

Project No. 2865

Date: May 01, 2023

Flewelling & Moody
Architecture planning interiors

PROJECT DIRECTORY

OWNER:	**COASTAL CHRISTIAN SCHOOL** 1005 North Oak Park Boulevard Pismo Beach, CA 93449 (805) 489-1213
ARCHITECT:	**FLEWELLING & MOODY** 815 Colorado Boulevard, Suite #200 Los Angeles, CA 90041 (323) 543-8300
CIVIL ENGINEER:	**CANNON** 1050 Southwood Drive San Luis Obispo, CA 93401 (805) 544-7407
STRUCTURAL ENGINEER:	**ASHLEY & VANCE ENGINEERING, INC.** 1729B Telegraph Avenue Oakland, CA 94612 (510) 473-2221
MECHANICAL & PLUMBING:	**BMA MECHANICAL** 100 Cross Street, Suite 204 San Luis Obispo, CA 93401 (805) 544-4269
ELECTRICAL ENGINEER:	**JMPE ELECTRICAL ENGINEERING** 627 Olive Street Santa Barbara, CA 93105 (805) 569-9216

FIRE PROTECTION: **DEEP BLUE INTEGRATION, INC.**
3442 Empresa Drive
San Luis Obispo, CA 93401
(888) 600-0324

LANDSCAPE ARCHITECT: **OASIS ASSOCIATES**
3427 Miguelito Court
San Luis Obispo, CA 93401
(805) 541-4509

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B. Contract Method.

C. Owner Occupancy.

D. Work Sequence.

E. Contractor Use of Premises.

F. Codes, Permits and Fees.

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H. Soil Report, Owner Furnished.

I. Site Conditions.

J. Contract Conditions and Requirements.

K. Specification Division Requirements.

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1.02 RELATED REQUIREMENTS

A. Section 00 70 00 - General Conditions of the Contract.

1. Article 1 - Contract Documents, work covered by.

2. Subparagraph 1.1.1 - The Contract Documents, defined.

3. Subparagraph 1.1.2 - The Contract, defined.

4. Subparagraph 1.1.3 - The Work, defined.

5. Subparagraph 1.1.4 - The Project, defined.

6. Subparagraphs 1.1.6 and 1.1.7 - The Specifications and The Project Manual, defined.

7. Subparagraph 2.2.3 - Information and Services Required of the Owner, payment of certain fees and charges.

8. Subparagraph 3.7.1, payment for building permits and related fees.

9. Subparagraph 3.7.2, compliance with codes.

B. Section 00 80 00 - Supplementary Conditions.

1. Subparagraph 2.2.3 - Information and Services required of the Owner, plan check and fees.

2. Paragraph 7.5 - Substitutions, determination of equivalency.

C. Section 01 40 00 - Quality Control.

1. Verification of existing site conditions.

2. Soil testing and inspection requirements.

D. Section 01 63 00 - Product Options and Substitutions: Determination of equivalency.

E. Section 01 70 00 - Contract Closeout: Project Record Documents.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

A. Work of this Contract includes all labor and materials to provide for demolition and general construction including mechanical and electrical work for the new Gymnasium / Locker and Liberal Arts Buildings and adjacent site work all as shown on the drawings and as specified.

B. Provide products, labor and equipment required to complete work of the scope indicated by the Contract Documents.

C. Refer to General and Supplementary Conditions, Article 1 - Contract Documents.

1.04 CONTRACT METHOD

A. Construct the Work under a single lump sum, cost plus or guaranteed maximum price contract. As defined in Section 00021, Information to Bidders.

1.05 OWNER OCCUPANCY

A. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

1.06 WORK SEQUENCE

A. Construct Work in stages to accommodate Owner occupancy. Coordinate Progress Schedule with Owner occupancy.

1.07 CONTRACTOR USE OF PREMISES

A. Limit use of premises to those functions required for prosecution of the work.

B. Obtain and pay for use of additional off-site storage or work areas needed for efficient prosecution of the work.

1.08 CODES, PERMITS AND FEES

A. Codes

1. Comply with codes as specified in Subparagraph 3.7.2 of the General Conditions.

2. Codes are defined below in this section.

B. Permits and Fees.

1. As specified in Subparagraph 2.2.3 and 3.7.1 of the General and Supplementary Conditions.

2. Obtain and pay for permits required.

3. Pay those fees required for the conduct of the work which are not required to be paid as pre-condition for plan check.

4. Owner will obtain and pay for plan check.

1.09 SURVEY, WHEN FURNISHED

A. The land survey when furnished, is not a bid or contract document. It is furnished by the Owner for information only.

B. The land survey was prepared for Owner by a licensed land surveyor who is solely responsible for its content. No liability shall attach to Owner, Architect or Engineer through Bidder or Contractor use of or reliance upon the information contained therein.

1.10 SOIL REPORT, WHEN FURNISHED

A. A geotechnical and/or seismicity investigation report (soils report), when required, will be prepared for the Owner by a registered Engineer. (the "Soils Engineer") Foundation and soil construction recommendations will be a part of this report. The "Soils Engineer" is solely responsible for its content.

B. The soils report is not a bid or contract document. It is furnished for information only.

C. No liability shall attach to Owner or Architect/Engineer through Bidder or Contractor use of or reliance upon the information contained therein.

D. The soils report is available for Bidder's examination at the Office of the Architect. Copies will be furnished Contractor for use during construction.

E. While the soils report is not a Contract Document, Bidders shall make all provision for and Contractor will be governed by the recommendations contained in the Soil Report as if they were Specified Requirements.

F. See Section 01410 for requirements for soil testing and inspection.

1.11 SITE CONDITIONS

A. Verify existing conditions at the site prior to bidding.

B. Conditions not indicated in the Contract Documents, or information documents, which are not observable or otherwise determinable at time of bid without the use of uncommon equipment and procedures and which subsequently affect the scope or time of the Work may be considered to represent a Change in the Work.

C. Provide in Bid and Contract for all other conditions of the site.

1. Refer to General Conditions, Paragraph 1.2, Execution, Correlation and Intent.

D. Report verification of existing site conditions as specified in Section 01409.

1.12 PROJECT RECORD DOCUMENTS

A. Provide and maintain as specified in Section 01700.

1.13 CONTRACT CONDITIONS AND REQUIREMENTS

A. Relevant provisions of the General and Supplementary Conditions, and of Division 1 - General Requirements, apply to each section in Divisions 2 through 16, whether or not mentioned therein, as though repeated therein.

1.14 SPECIFICATION DIVISION REQUIREMENTS

A. In the sections of Divisions 2 through 16 various lists occur, such as "Work Included", "Materials" and "Installation".

1. Such lists are not all-inclusive.

2. Provide whatever is reasonably implied by the Contract Documents as being necessary to produce the intended results.

3. Refer to General Conditions: Subparagraph 1.1.3 - The Work, and Paragraph 1.2 - Execution, Correlation and Intent.

1.15 DEFINITIONS AND EXPLANATIONS

A. Building Code.

1. Includes:
   a. The building code applicable at the place of construction.
      1) The California Building Code, referred to as CBC or UBC hereinafter.
      2) Usually named in the General Notes on the drawings or as specified in Section 01060.
   b. All other codes (viz: Fire; Plumbing; Mechanical; Electrical) laws, ordinances, regulations and statutory requirements applicable at the place of construction on:
      1) Date of Bid.
      2) Date of Contract, if there was no bid.
      3) Date of Building Permit, if there is no general contract.
   c. Those published requirements of Utility Departments or Companies which must be complied with to obtain utility service.

2. Conflicting requirements:
   a. The most strict requirements of the above noted codes shall govern.
   b. Contract requirements more stringent than code requirements shall govern.

B. Building Department or Local Authority.

1. All agencies, individually or collectively, charged by statute with administration and enforcement of the requirements of the Building Code at the place of construction.

C. Building Official.

1. The person or persons, individually or collectively, employed, by the governmental entities having jurisdiction, for the administration of Building Dept. agencies.

2. Authorized representatives of Building Department agencies, viz: Inspectors, Plan Checkers, etc.

D. Contract. The agreement between Owner and Contractor.

1. See General Conditions, Subparagraph 1.1.2.

E. Contract Documents. Those documents defining and describing the work of the Contract.

1. See General Conditions, Subparagraph 1.1.1 and 1.2.3.

2. The Contract Documents consist of the Owner-Contractor Agreement, the Conditions of the Contract (General, Supplementary and other Conditions), the Drawings, the Specifications, and all Addenda issued prior to and all Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the Architect, or (4) a written order for a minor change in the Work issued by the Architect. The Contract Documents do not include Bidding Documents such as the Advertisement or Invitation to Bid, the Instructions to Bidders, sample forms, the Contractor's Bid or portions of Addenda relating to any of these, or any other documents, unless specifically enumerated in the Owner-Contractor Agreement.

3. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such meanings.

F. Work, the: The total of the work performed under the Contract.

1. See General Conditions, Subparagraph 1.1.3.

G. Project, the: The entirety of which the Work may be the whole or a part.

1 See General Conditions, Subparagraph 1.1.4.

H. Addenda: Textual and/or graphic modifications of the Documents; issued prior to execution of the Agreement. They are Contract Documents except for any Bidding Requirements contained therein.

I. Drawings, the: The graphic portion of the Documents. Refer to the Index to Drawings which is provided on one of the drawings. May be listed in the Agreement.

J. Project Manual.

1. Generally the textual portion of the Documents. Written, in general, in the imperative style. Requirements and instructions are addressed solely to the Contractor whether or not specifically so indicated.

2. Content.
   a. Bidding requirements.
   b. Sample forms.
   c. Conditions of the Contract.

d. Specifications.

K. Specifications.

1. The sections of text comprising Divisions One (1) through Sixteen (16) of the Project Manual. The Sections of Divisions 2 through 16 may be referred to as the "technical" specifications.

2. Text information appearing anywhere in the Documents which requires an action or establishes parameters shall be deemed a part of the Specifications.

L. Related Work or Requirements: Appears in most Sections of Project Manual. Refers reader to other Sections or Documents which contain information directly relating to the work described in the preceding article titled "Work (or Requirements) Included".

M. Products(s): Includes in its meaning materials, manufactured items, assemblies, equipment, systems, processes and procedures installed or to be installed in the Work.

N. Utilities.

1. Utility (singular).
   a. The company, municipal department or franchise which owns the basic constructions and/or transmission/transportation facilities used to provide a particular utility service at the place of construction.

2. Utilities (plural).
   a. All utility entities in the aggregate (capitalized).
   b. All properties, constructions or devices, on or off site, whether or not owned by a Utility, used to provide the services of Utilities to a building or other property and to points of connection within such building or property.

3. The terms include, but are not limited to: Flood control; sewer; water; gas; electricity; telephone; TV cable service; compressed, liquefied, or cryogenic gases; steam; refrigerant ammonia.

O. Words.

1. Referential; indicated, shown, detailed, noted, etc. Refers to specific requirements appearing elsewhere at one or more places in the Contract Documents.

2. Directional; directed, designated, selected, etc. Refers to the directional instructions of the Architect/Engineer unless otherwise stated.

3. Instructional; provide, perform, etc. Implies the inclusion of all labor, material, products, tools, equipment, services and transportation needed to furnish and install the referenced work complete and ready for use.

4. Requirements; required, necessary, etc. Implies everything necessary to make the referenced work comply with, usually, the Contract Documents, and/or if indicated, with certain standards or statutes.

5. Equivalency; equal to, equivalent, acceptable, etc. Determination of equivalency requires a judgment by Architect/Engineer and/or Owner and is not a Contractor's option. Refer to:
   a. Section 01 63 00, Product Options and Substitutions.
   b. Paragraph 3.3 of the Instructions to Bidders.
   c. Paragraph 7.5 in the Supplementary Conditions.

2.00 – PRODUCTS (NOT USED)

3.00 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 09 00
REFERENCE STANDARDS

1.00 – GENERAL

1.01 SUMMARY

A. Section Includes: Reference Standards

1.02 ABBREVIATIONS AND ACRONYMS

A. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications, they mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction, or other entity applicable to the context of the text provision.

B. The names, addresses, and telephone numbers given in the List of Organizations are subject to change and are believed to be, but are not assured to be, accurate and up to date as of the issue date of this Section.

C. List of Organizations: Certain Standards issued by the following organizations may be referenced in the Specifications. Copies may be obtained from the issuing organization.

1.03 REFERENCE STANDARDS

AA Aluminum Association
(202) 862-5100
900 19th St., NW, Suite 300
Washington, DC 20006

ABC Associated Air Balance Council
(202) 737-0202
1518 K St., NW, Suite 503
Washington, DC 20005

AAMA American Architectural Manufacturer's Association
(847) 303-5664
1827 Walden Office Sq., Suite 104
Schaumburg, IL 60173

ACI American Concrete Institute
(248) 848-3700
P.O. Box 9094
Fumington Hills, MI 48333-9094

AGA American Gas Association
(703) 841-8400
1515 Wilson Blvd.
Arlington, VA 22209

AHA American Hardboard Association
(847) 934-8800
1210 W. Northwest Hwy
Palatine, IL 60067-1897

AI Asphalt Institute
(606) 288-4960
Research Puk Dr.
P.O. Box 14052
Lexington, KY 40512-4052

AIA The American Institute of Architects
(202) 626-7300
1735 New York Ave., NW
Washington, DC 20006-5292

AISC American Institute of Steel Construction
(800) 644-2400
One East Wacker Dr., Suite 3100
Chicago, IL 60601-2001

AITC American Institute of Timber Construction
7012 South Revere Parkway, Suite 140
Engelwood, CO 80112

AISI American Iron and Steel Institute
(202) 452-7100
1101 17th St., NW
Washington, DC 20036-4700

ALSO American Lumber Standards Committee
(301) 972-1700
P.O. Box 210
Germantown, MD 20875

AMCA Air Movement and Control Association International, Inc.
(847) 394-0150
30 W. University Dr
Arlington Heights, IL 60004-1893

ANSI American National Standards Institute
(212) 642-4900
25 West 43rd Street, Fourth Floor
New York, NY 10036-8002

APA APA-The Engineered Wood Association
(206) 565-6600
(Formerly: American Plywood Association)
P. O. Box 11700
Tacoma, WA 98411-0700

APA Architectural Precast Association
(941) 454-6989
P.O. Box 08669
Fort Myers, FL 33908-0669

ARI Air-Conditioning and Refrigeration Institute
(703) 524-8800
4301 Fairfax Dr., Suite 425
Arlington, VA 22203

ASA Acoustical Society of America
(516) 576-2360
500 Sunnyside Blvd.
Woodbury, NY 11797

ASC Adhesive and Sealant Council
(202) 452-1500
1627 K St., NW, Suite 1000
Washington, DC 20006-1707

ASCE American Society of Civil Engineers
(800) 548-2723
World Headquarters
(703) 295-6000
1801 Alexander Bell Dr.
Reston, VA 20191-4400

ASHRAE American Society of Heating, Refrigerating
(800) 527-4723
and Air-Conditioning Engineers
(404) 636-8400
1791 Tullie Circle, NE
Atlanta, GA 30329-2305

ASLA American Society of Landscape Architects
(202) 686-2752
4401 Connecticut Ave., NW, 5th Floor
Washington, DC 20008-2369

ASME American Society of Mechanical Engineers
(800) 434-2763
Three Park Avenue
(212) 705-7722
New York, NY 10016-5990

ASSE American Society of Sanitary Engineering
901 Canterbury, Suite A
Westlake, OH 44145

ASTM American Society for Testing and Materials
(610) 832-9500
100 Barr Harbor Dr.
West Conshohocken, PA 19428-2959

AWI Architectural Woodwork Institute
(703) 733-0600
1952 Isaac Newton Sq.
Reston, VA 20190

AWPA American Wood Preservers' Association
(817) 326-6300
3246 Fall Creek Hwy, Suite 1900
Grandbury, TX 76049-7979

AWS American Welding Society
(800) 443-9353
550 NW LeJeune Rd.
(305) 443-9353
Miami, FL 33126

AWWA American Water Works Association
6666 Quincy Avenue
Denver CO 80235

BHMA Builders Hardware Manufacturers Association
(212) 661-4261
355 Lexington Ave., 17th Floor
New York, NY 10017-6603

BIA Brick Institute of America
(703) 620-0010
11490 Commerce Park Dr.
Reston, VA 22091-1525

CRI Carpet and Rug Institute
(800) 882-8846
310 S. Holiday, Ave.
(706) 278-3176
Dalton, GA 30722-2048

CRSI Concrete Reinforcing Steel Institute
(847) 517-1200
933 N. Plum Grove Rd.
Schaumburg, IL 60173-4758

CTI Ceramic Tile Institute of America
(310) 574-7800
12061 West Jefferson Blvd.
Culver City, CA 90230-6219

DHI Door and Hardware Institute
(703) 222-2010
(Formerly: National Builders Hardware Association)
14170 Newbrook Dr.
Chantilly, VA20151-2223

EIMA EIFS Industry Members Association
(800) 294-3462
402 N. Fourth St., Suite 102
(509) 457-3500
Yakima, WA 98901-2470

EJMA Expansion Joint Manufacturers Association
(914) 332-0040
25 N. Broadway
Tarrytown, NY 10591-3201

FCICA Floor Covering Installation Contractors Association
(Formerly: Floor Covering Installation Bond) (706) 226-5488
P.O. Box 948
Dalton, GA 30722-0948

FM Factory Mutual System
(781) 762-4300
1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, MA 02062-9102

GA Gypsum Association
(202) 289-5440
810 First St., NE, Suite 510
Washington, DC 20002

GANA Glass Association of North America
(913) 266-7013
(Formerly: Flat Glass Marketing Association)
3310 SW Harrison St.
Topeka, KS 66611-2279

HMA Hardwood Manufacturers Association (412) 829-0770
(Formerly: Southern Hardwood Lumber)
Manufacturers Association)
400 Penn Center Blvd., Suite 530
Pittsburgh, PA 15235-5605

HPVA Hardwood Plywood and Veneer Association
(703) 435-2900
1825 Michael Farraday Dr.
P.O. Box 2789
Reston, VA 22195-0789

ICC International Code Council
(703) 931-4533
5203 Leesburg Pike, Suite 708
Falls church, VA 22041

ICBO International Conference of Building Officials
5360 Workman Mill Road
(800) 423-6587
Whittier, CA 90601-2298

IIDA International Interior Design Association
(312) 467-1950
341 Merchandise Mart
Chicago, IL 60654-1104

INCE Institute of Noise Control Engineering
(914) 462-4006
P.O. Box 3206, Arlington Branch
Poughkeepsie, NY 12603

ISA ISA - International Society for Measurement and Control
P.O. Box 12277
(919) 549-9411
67 Alexander Dr.
Research Triangle Park, NC 27709

ISS Iron and Steel Society
(412) 776-1535
410 Commonwealth Dr.
Warrendale, PA 15086-7512

KCMA Kitchen Cabinet Manufacturers Association
(703) 264-1690
(Formerly: National Kitchen Cabinet Association)
1899 Preston White Dr.
Reston, VA 22091-4326

LGSI Light Gage Structural Institute
(972) 625-4560
c/o Loseke Technologies, Inc.
P.O. Box 560746
The Colony, TX 75056

LMA Laminating Materials Association
(201) 664-2700
(Formerly: American Laminators Association)
Hillsdale, NJ 07642-2730

MBMA Metal Building Manufacturer's Association
(216) 241-7333
c/o Thomas Associates, Inc.
1300 Sumner Ave.
Cleveland, OH 44115-2851

MCAA Mechanical Contractors Association of America
(301) 869-5800
1385 Piccud Dr.
Rockville, MD 20850-4329

MFMA Metal Framing Manufacturers Association
(312) 644-6610
(Formerly: Wood and Synthetic Flooring Institute)
401 N. Michigan Ave.
Chicago, IL 60611

MIA Marble Institute of America
(440)-250-9222
28901 Clemens Road, Suite 100
Cleveland, Ohio 44145 USA

MIA Masonry Institute of America
(213) 388-0472
2550 Beverly Blvd.
Los Angeles, CA 90057

ML/SFA Metal Lath/Steel Framing Association
(312) 456-5590
(A Division of the NAAMM)
8 South Michigan Ave., Suite 1000
Chicago, IL 60603

NAAMM National Association of Architectural Metal Manuf.
8 South Michigan Ave., Suite 1000
(312) 456-5590
Chicago, IL 60603

NAIMA North American Insulation Manufacturers Assoc.
(703) 684-0084
(Formerly: Thermal Insulation Manufacturers Association)
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314

NAPA National Asphalt Pavement Association
(301) 731-4748
NAPA Building
5100 Forbes Blvd.
Lanham, MD 20706-4413

NBGQA National Building Granite Quarries Asson.
800-557-2848
1220 L. Street, NW, Suite 100-167
Washington, DC 20005

NCMA National Concrete Masonry Association
(703) 713-1900
2302 Horse Pen Rd.
Herndon, VA 20171-3499

NECA National Electrical Contractors Association
(301) 657-3110
3 Bethesda Metro Center, Suite 1100
Bethesda, MD 20814-5372

NEI National Elevator Industry
(201) 944-3211
185 Bridge Plaza North, Suite 310
Fort Lee, NJ 07024

NEMA National Electrical Manufacturers Association
(703) 841-3200
1300 N 17th St., Suite 1847
Rosslyn, VA 22209

NFPA National Fire Protection Association
(800) 344-3555
One Batterymarch Park
(617) 770 3000
P.O. Box 9101
Quincy, MA 02269-9101

NHLA National Hardwood Lumber Association
(901) 377-1818
P.O. Box 34518
Memphis, TN 38184-0518

NLGA National Lumber Grades Authority
(604) 524-2393
#46-First Capital Pl.,
960 Quayside Dr.
New Westminster, BC V3M 6G2

NPA National Particleboard Association
(301) 670-0604
18928 Premiere Court
Gaithersburg, MD 20879-1569

NPCA National Paint and Coatings Association
(202) 462-6272
1500 Rhode Island Ave., NW
Washington, DC 20005-5597

NRCA National Roofing Contractors Association
(800) 323-9545
O'Hare International Center
(847) 299-9070
10255 W. Higgins Rd., Suite 600
Rosemont, IL 60018-5607

NRMCA National Ready Mixed Concrete Association
(301) 587-1400
900 Spring St.
Silver Spring, MD 20910

NUSIG National Uniform Seismic Installation Guidelines
12 Lahoma Ct.
(510) 946-0135
Alamo, CA 94526

NWWDA National Wood Window and Door Association
(800) 223-2301
(Formerly: National Woodwork Manuf. Assoc'n)
(847) 299-5200
1400 E. Touhy Ave., G-54
Des Plaines, IL 60018 (See WDMA)

PCA Portland Cement Association
(847) 966-6200
5420 Old Orchard Rd.
Skokie, IL 60077-1083

PCI Precast/Prestressed Concrete Institute
(312) 786-0300
175 W. Jackson Blvd., Suite 1859
Chicago, IL 60604

PDCA Painting and Decorating Contractors of America
(800) 332-7322
3913 Old Lee Hwy, Suite 33-B
(703) 359-0826
Fairfax, VA 22030

PEI Porcelain Enamel Institute
(615) 385-5357
4004 Hillsboro Pike, Suite 224-B
Nashville, TN 37215

RFCI Resilient Floor Covering Institute
(301) 340-8580
966 Hungerford Dr., Suite 12-B
Rockville, MD 20850-1714

RMA Rubber Manufacturers Association
(800) 220-7620
1400 K St., NW, Suite 900
(202) 682-4800
Washington, DC 20005

SAE SAE International
(412) 776-4841
400 Commonwealth Dr.
Warrendale, PA 15096-0001
For publications: Call (412) 776-4970

SDI Steel Door Institute
(216) 889-0010
30200 Detroit Rd.
Cleveland, OH 44145-1967

SHLMA Southern Hardwood Lumber Manufacturers Association
(See HMA)

SIGMA Sealed Insulating Glass Manufacturers Association
401 N. Michigan Ave.
(312) 644-6610
Chicago, IL 60611-4267

SJI Steel Joist institute
(803) 626-995
3127 10th Ave., North Ext.
Myrtle Beach, SC 29577-6760

SMACNA Sheet Metal and Air Conditioning
(703) 803-2980
Contractors' National Association, Inc.
4201 Lafayette Center Dr.
P.O. Box 221230 Chantilly, VA 20151-1209

SPIB Southern Pine Inspection Bureau
(904) 434-2611
4709 Scenic Hwy
Pensacola, FL 32504-9094

SPRI Single Ply Roofing Institute
(617) 444-0242
175 Highland Ave.
Needham Heights, MA 02194-3034

SSPC Steel Structures Painting Council
(412) 281-2331
40 24th St., 6th Floor
Pittsburgh, PA 15222-4643

SWRI Sealant, Waterproofing and Restoration Inst.
(816) 472-7974 2841 Main
Kansas City, MO 64108

TCA Tile Council of America
(864) 646-8453
100 Clemson Rescue Blvd.
Anderson, SC 29625

UL Underwriters Laboratories Inc.
(800) 704-4050
333 Pfingsten Rd.
(847) 272-8800
Northbrook, IL 60062

WA Wallcoverings Association
(312) 644-6610
401 N. Michigan Ave.
Chicago, IL 60611-4267

WCLIB West Coast Lumber Inspection Bureau
(503) 639-0651
P.O. Box 23145
Portland, OR 97281-3145

WDMA Window and Door Manufacturers Association
(800) 223-2301
(Formerly: National Woodwork Manuf. Assoc'n)
(847) 299-5200
1400 E. Touhy Ave., G-54
Des Plaines, IL 60018

WWPA Western Wood Products Association
(503) 224-3930
Yeon Building
522 SW 5th Ave.
Portland, OR 97204-2122

GOVERNMENT AGENCIES:

DOT Department of Transportation
(202) 366-4000
400 Seventh St., SW
Washington, DC 20590

EPA Environmental Protection Agency
(202) 260-2090
401 M St., SW
Washington, DC 20460

GSA General Services Administration
(202) 708-5082
F St. and 1 8th St., NW
Washington, DC 20405

NIST National Institute of Standards and Tech.
(301) 975-2000
(U.S. Department of Commerce)
Building 101, #AI 134,
Rte. I-270 and Quince Orchid Rd.
Gaithersburg, MD 20899

END OF SECTION

SECTION 01 20 00
PROJECT MEETINGS

1.00 – GENERAL

1.01 DESCRIPTION

A. Work included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the CONSTRUCTION MANAGER will conduct project meetings throughout the construction period.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, the Conditions of the Contract and Sections in Division 1 of these Specifications.

2. The CONTRACTOR'S relations with his subcontractors and materials suppliers, and discussions relative thereto, are the CONTRACTOR'S responsibility and normally are not part of project meetings content.

1.02 QUALITY ASSURANCE

A. For those persons designated by the CONTRACTOR to attend and participate in project meetings, CONTRACTOR shall provide required authority to commit the CONTRACTOR to solutions agreed upon in the project meetings.

1.03 SUBMITTALS

A. Agenda items: To the maximum extent practicable, advise the CONSTRUCTION MANAGER at least twenty-four (24) hours in advance of project meetings regarding items to be added to the agenda.

B. Minutes:

1. The CONSTRUCTION MANAGER will compile minutes of each project meeting, and will fax or make available required copies to the CONTRACTOR and required copies to the OWNER, ARCHITECT and INSPECTOR.

2. Recipients of copies may make and distribute such other copies at their discretion.

2.00 – PRODUCTS (NOT USED)

3.00 – EXECUTION

3.01 MEETING SCHEDULE

A. Except as noted below for Pre-Construction Meeting, project meetings will be held weekly.

B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.02 MEETING LOCATION

A. The ARCHITECT in conjunction with the CONSTRUCTION MANAGER will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.03 PRECONSTRUCTION MEETING

A. Pre-Construction Meeting will be scheduled by the CONSTRUCTION MANAGER and held within seven (7) working days after the OWNER has issued the Notice to Proceed.

1. Provide attendance by authorized representatives of the CONTRACTOR and major subcontractors. (Major subcontractors pre-approved by the CONSTRUCTION MANAGER)

2. The CONSTRUCTION MANAGER will advise other interested parties, including the OWNER, ARCHITECT, ARCHITECT'S Consultants, Inspector, Testing Lab and request their attendance. In all cases, the meetings shall be coordinated by the CONSTRUCTION MANAGER to maximize meeting input and minimize the number of meetings required.

B. Minimum Agenda: Data will be distributed and discussed on at least the following items.

1. Organizational arrangement of CONTRACTORS forces and personnel, and those of subcontractors, materials suppliers, ARCHITECT, and CONSTRUCTION MANAGER.

2. Channels and procedures for communication.

3. Construction schedule, including sequence of critical work.

4. Contract Documents, including distribution of required copies of original Documents and revisions.

5. Processing of Shop Drawings and other data submitted to the ARCHITECT through the CONSTRUCTION MANAGER for review.

6. Processing of Bulletins, field decisions, Work Orders, and Change Orders.

7. Rules and regulations governing performance of the work.

8. Procedures for safety and first aid, security, quality control, housekeeping, and related matters.

9. Format and procedures for submitting "Application and Certificate for Payment" and "Schedule of Values" forms.

3.04 PROJECT MEETINGS

A. Attendance:

1. The CONTRACTOR will assign the same person or persons to represent the CONTRACTOR at the mandatory project meetings throughout progress of the Work.

2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the Work is involved, as pre-approved by the CONSTRUCTION MANAGER.

B. Minimum Agenda:

1. Review, revise as necessary, and approve minutes of previous meetings.

2. Review progress of the Work since last meeting, including status of long-lead submitted material and equipment.

3. Identify problems which impede planned progress.

4. Develop corrective measures and procedures to regain planned schedule.

5. Complete other current business.

6. Revisions to minutes.

7. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting (meetings are scheduled every seven (7) days, they will be accepted as properly stating the activities and decisions of the meeting.

8. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.

9. Challenge to minutes shall be settled as priority portion of "old business" at the next regularly scheduled meeting.

END OF SECTION

SECTION 01 30 00
SUBMITTALS

1.00 – GENERAL

1.01 WORK INCLUDED

A. Whenever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined, either by manufacturer's name and catalog number, or by reference to recognized industry standards.

B. To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data, and for review and acceptance or rejection by the ARCHITECT.

2.00 – PRODUCTS

2.01 SHOP DRAWINGS, PRODUCT DATE, SAMPLES AND COLOR SELECTION

A. See Section 01340 - Shop Drawings, Product Data and Samples.

2.02 CERTIFICATES OF COMPLIANCE AND TESTING REPORTS

A. See Section 01415 - Testing and Inspection Requirements.

2.03 MAINTENANCE AND OPERATING MANUALS

A. See Section 01700 - Contract Close-out

B. See Section 01730 - Operating and Maintenance Data.

2.04 PROJECT RECORD DRAWINGS

A. See Section 01700 - Contract Close-out.

2.05 GUARANTIES, WARRANTIES AND BONDS

A. See Section 01740 – Warranties, Guaranties and Bonds.

2.06 SCHEDULE OF VALUES

A. Submit to CONSTRUCTION MANAGER as required by the General Conditions within seven (7) calendar days after issuance of the Notice to Proceed.

2.07 PROGRESS SCHEDULE

A. Submit to the CONSTRUCTION MANAGER as required by Specification Section 01300 and the General Conditions within seven (7) calendar days after issuance of Letter of Intent.

2.08 CONTRACTOR SAFETY PLAN

A. Contractor shall submit to the Construction Manager their Company Safety Plan within seven (7) calendar days after issuance of the Letter of Intent.

3.00 – EXECUTION

3.01 COORDINATION OF SUBMITTALS

A. General: Prior to submittal to CONSTRUCTION MANAGER for ARCHITECT'S review, use all means necessary to fully coordinate all materials, including the following procedures:

1. Determine and verify all field dimensions and conditions, materials, catalog numbers, and similar data.

2. Coordinate as required with all trades and with all public agencies involved.

3. Secure all necessary approvals from public agencies and others, and signify by stamp, or other means, that they have been secured.

4. CONSTRUCTION MANAGER and ARCHITECT to furnish shop drawing and submittal registry for CONTRACTOR to comply with. As a Reference only: this does not relieve the CONTRACTOR from complying with all submittals and Shop Drawings as required by Contract Documents)

B. Grouping of Submittals: Unless otherwise specifically permitted by the ARCHITECT, make all submittals in groups containing all associated items. The ARCHITECT will reject partial submittals as not complying with the provisions of the Contract Documents.

C. Color Selection: The ARCHITECT requires that all items requiring a color selection must be submitted before any color selection is issued.

D. Minimum of seven (7) copies of each submittal is required.

3.02 IDENTIFICATION

A. Completely identify each submittal and submit using forms provided and showing the following minimum information:

1. Name and address of submitter, plus name and telephone number of the individual who may be contacted for further information.

2. Complete name of Project.

3. Drawings number and Specifications Section number to which the submittal applies.

4. Whether this is an original submittal or resubmittal. Resubmittals are to be clearly marked using original number with "Revision #____"

5. Date submittal was prepared or revised.

6. Stamp affixed with signature that the submitted or resubmitted item or items meet prime CONTRACTOR'S approval.

3.03 TIMING OF SUBMITTALS

A. All material submittals and shop drawings must be delivered to CONSTRUCTION MANAGER within fourteen (14) calendar days after issuance of Notice to Proceed. If the CONTRACTOR fails to respond to this submittal schedule, the CONTRACTOR shall be subject to damages. Parties agree that delays in submittal and Shop Drawings will constitute a probable delay in Project completion.

B. Project construction schedule and schedule of values must be delivered to CONSTRUCTION MANAGER within seven (7) calendar days after issuance of Notice to Proceed.

END OF SECTION

SECTION 01 34 00
SHOP DRAWINGS AND SAMPLES

1.00 - GENERAL

1.01 SCOPE

A. These provisions amend Shop Drawings, Product Data and Samples, of the General Conditions of the Contract for Construction, by establishing submittal procedures for shop drawings and samples required by the various technical sections.

1.02 GENERAL REQUIREMENTS

A. Prior to submission to the Architect through the Construction Manager, all shop drawings, brochures, and other such construction data shall be checked for quantity, size, and dimensions by the Contractor's personnel especially assigned for this purpose. The Architect will answer questions raised by the Contractor, and will make all determination regarding quality of material and equipment, design and arrangement decisions, and color selections, but will not be responsible for quantity, size, or dimensional errors on the shop drawings. In cases of omission and obvious error, and in cases of conflict, either between details on the contract drawings, or specifications, such questions shall be called to the Architect's attention, and the Architect will give prompt answers to such questions.

1. Colors and textures to be selected shall be selected from all available colors and textures, regardless of the price ranges. For instance: Where the first manufacturer listed has 20 colors or color ways available, that is the minimum number that shall be available for selection. The products of other manufacturers may be submitted, but the cost of colors, considered special, shall be included in the base bid, if their number is less than 20. When colors or textures are custom from any manufacturer, they will be identified.

B. Carefully review the Subcontractors' submittals for completeness and correctness, and stamp and acknowledge such review on submittals, prior to transmitting them to the Architect.

C. Close adherence to these requirements is necessary to avoid delay in the processing of the shop drawings by the Architect. Deviation from these requirements may result in rejection of the submittal. The Contractor will be held responsible for delays resulting from improper submittals.

D. Obtain approvals from required agencies, prior to submittal to the Architect, for all revisions, substitutions of materials or design, including all structural deviation from the design as shown and as specified.

1.03 SUBMITTALS

A. Shop Drawings:

1. One transparent vellum reproducible, reverse-reading.

2. Seven blueline or blackline prints bound in sequence.

B. Product Data: Includes Brochures, Material Lists, Specifications, Concrete Mix Designs and etc.: Seven sets each bound in sequence.

C. Samples: Three each, unless additional samples are requested by the Owner.

1.04 SUBMITTAL PROCEDURES

A. All submittals shall be identified with the job name, location, and the Architect's job number. They shall be reviewed, stamped with an approximately 3" x 1/2" identification stamp, and have the signed approval of the Contractor, prior to submission to the Architect. Each sheet of drawings, both prints and transparencies, shall be so identified and signed.

B. Bound sets of brochures, catalog sheets, specifications and materials lists shall include an Index Sheet, completely identifying the entire contents of the submittal in sequential order. At his option, the Contractor may identify, stamp and sign only this Index Sheet.

C. In lieu of signing each brochure, the Contractor may indicate on the Letter of Transmittal that he has reviewed and approved all the material included. This does not eliminate the requirements for identification stamp information.

D. The Architect will return to the Contractor one copy of the vellum transparency of the drawings and two brochures, stamped and signed with the corrections, if any. If the Contractor desires additional copies returned, then he must so request and submit the extra copies.

E. Handle re-submittals the same as the original submittals, but identify as such and use the Architect's original shop drawing number.

F. Each submittal shall be accompanied by a Letter of Transmittal containing a complete itemized and numbered list of the submitted material together with the subcontractor's name. A separate Letter of Transmittal shall accompany each submittal from different Subcontractors and different categories (trade and building units).

G. Shop drawing submittals shall be segregated and submitted separately for each building unit comprising the entire project. The submittals shall be made as though each building unit and the site are separate projects.

1.05 SAMPLES

A. Labeling: Identify each sample with at least a 3" x 4" label with the following information.

1. Complete identification stamp information in accordance with Submittals Procedure Paragraph 1.04.A above.

2. Name, finish, and composition of the material.

3. Location or intended use on the project.

B. Size of Samples: Provide samples of sufficient size to show all salient features of the material or item, and which are truly representative of the extremes of variation in color, texture, finish, and construction to be expected in the installed work. Samples of framing materials shall include a corner joint. Allow space for a 5" x 3" Architect's review stamp.

C. Mock-Ups: Various specification sections may require mock-ups of proposed construction elements, using actual materials and full-size components. Such mock-ups shall be included in the contract sum.

D. Review of Samples: Upon review, the samples will be stamped or labeled to indicate their review, and one of the samples will be returned to the Contractor. The samples retained by the Architect will constitute the standard of quality and appearance of all materials of the type represented by the sample. In the event samples are rejected, the Contractor will be given the reasons for rejection and he shall resubmit samples until, in the opinion of the Architect, they comply with the contract requirements.

E. At the option of the Owner or Architect, samples may be subject to testing. In such event, additional samples as may be required shall be supplied by the Contractor at no additional cost.

2.00 – PRODUCTS (NOT USED)

3.00 - EXECUTION

3.01 CONTRACTOR'S REVIEW

A. The CONTRACTOR shall check and coordinate the Drawings and data, verify all field measurements, stamp with CONTRACTOR’S approval, and submit submittals and Shop Drawings to the ARCHITECT, through the CONSTRUCTION MANAGER, within fourteen (14) calendar days after issuance of Letter of Intent. Parties agree that delays in submittals and Shop Drawings will constitute a probable delay in Project.

B. The CONTRACTOR shall make any corrections required by the ARCHITECT and resubmit the required number of corrected copies within five (5) days of receipt of returned items, through the CONSTRUCTION MANAGER. Parties agree that delays in submittals and Shop Drawings.

3.02 ARCHITECT'S REVIEW

A. The ARCHITECT will review shop drawings within fourteen (14) calendar days and drawings, only for conformance and compliance with the design concept of the Project per information given in the Contract Documents.

B. The ARCHITECT'S review of such drawings or data shall not relieve the CONTRACTOR from responsibility for deviations from Drawings or Specifications. CONTRACTOR shall call to the ARCHITECT'S and OWNER'S attention, through the CONSTRUCTION MANAGER, all deviation and have secured written approval. Approval shall not relieve CONTRACTOR from responsibility for errors in Shop Drawings or data.

END OF SECTION

SECTION 01 40 00
QUALITY CONTROL

1.00 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. Quality Control, General.

B. Replacement of Non-Conforming Work.

C. Coordination.

D. Reference Standards for Products.

E. Control of Substitutions.

F. Workmanship.

G. Manufacturer's License or Franchise.

H. Manufacturer's Instructions.

I. Manufacturer's Certificates.

J. Manufacturer's Field Services

K. Inspection by Contractor or Subcontractor.

L. Observations and Inspections by Architect and Engineer.

M. Inspections and Observations by D.S.A. Inspector.

N. Horizontal and Vertical Control.

O. Mockups.

P. Field Finishes.

1.02 RELATED WORK

A. Related Requirements in other parts of the Project Manual: Inspections and testing required by laws, ordinances, rules, regulations, orders or approval of authorities and General Conditions.

B. Related Requirements Specified in Other Sections:

1. Certification of Products: The respective section of this Specification.

2. Test, Adjust, and Balance of Equipment: The respective section of this Specification.

3. Laboratory Test Required, and Standards for Testing: Section 01415.

1.03 OWNER INSPECTOR

A. An Inspector employed by the OWNER in accordance with the requirements of the State of California Code of Regulation, Title 24, will be assigned to the Work. His duties are specifically defined in Title 24, Part 1, Section 4-342.

B. The work of construction in all stages of progress shall be subject to the personal continuous observation of the Inspector. He shall have free access to any or all parts of the Work at any time. The CONTRACTOR shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of the materials. Inspection of the Work shall not relieve the CONTRACTOR from any obligation to fulfill this Contract.

1.04 QUALITY CONTROL, GENERAL

A. Require subcontractors, installers, suppliers or manufacturers to provide, products, services, site conditions, and workmanship, necessary to produce work conforming to requirements of Contract Documents.

1.05 NON-CONFORMING WORK

A. Replace work not conforming to requirements of Contract Documents.

1.06 COORDINATION

A. Coordinate work of the various sections of Specifications to assure efficient and orderly sequence of installation of construction elements without jobsite interference and without overlap or gaps between the scope of work of the various trades.

B. Schedule construction progress as specified in Section 01310.

C. Coordinate the efficient, orderly installation of sleeves and various anchorage inserts to permit later work to pass through or anchor to preceding construction.

1. Blocking out for such items and subsequent filling shall be done only with Architect/Engineer's permission.

D. Verify characteristics of elements of interrelated operating equipment are compatible.

1. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service such equipment.

E. Coordinate space requirements and installation of mechanical and electrical work that are indicated diagramatically on Drawings.

1. Assign levels, elevations, spaces to permit installation of mechanical and electrical work within the indicated space.

2. Follow routing shown for pipes, ducts, conduits as closely as practicable.

a. Make runs parallel with lines of building.

b. Make horizontal runs level U.N.O. Make vertical runs plumb except for required offsets.

c. Make vertical runs on and attached to elements of structure unless pipe, duct or conduit is otherwise made structurally sufficient to resist seismic or impact stress.

3. Utilize spaces efficiently to maximize accessibility of each trades installations for maintenance or repair.

4. Coordinate locations of fixtures and outlets with other elements of finish.

F. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring in the construction. Consult Architect regarding acceptable method of achieving furring required but not indicated.

1.07 REFERENCE STANDARDS FOR PRODUCTS

A. For products specified by association, trade, governmental or military standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. The date of the standard is that in effect as of Bid date, or date of Owner or Contractor Agreement when there are no bids, except when a specific edition of the standard is indicated.

C. Obtain copies of standards when required by Contract Documents. Maintain copy at jobsite during progress of the affected work.

D. Provide products of the quality and in the manner specified in Section 01600.

1.08 CONTROL OF SUBSTITUTIONS

A. Permit substitution of products only in conformity with restrictions specified in Section 01630.

1.09 WORKMANSHIP

A. Provide and require subcontractor and installers to provide knowledgeable, skilled supervision and labor in the quantity required to achieve completion within the Contract Time.

B. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

C. Comply with manufacturer's instructions. Should instructions conflict with other Contract Requirements, request clarification from Architect before proceeding.

D. Perform work using persons capable of producing workmanship of indicated quality.

E. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.10 MANUFACTURER REQUIREMENTS

A. When specified in technical specification section, require manufacturers to provide the following information and services. Make submittals accompanying, and in quantity required for Product Data as specified in Section 01340, unless otherwise indicated.

1. Manufacturer's License or Franchise: Submit certification by manufacturer that subcontractor or installer is licensed or franchised to install manufacturer's product.

2. Manufacturer's Instructions: Submit manufacturer's printed instructions or recommendations for delivery, storage, handling, assembly, installation, finishing, start-up, adjustment, maintenance, all as appropriate to product.

3. Manufacturer's Certificates: Submit manufacturer's certification that product meets or exceeds requirements of Contract Documents.

4. Manufacturer's Field Services:

a. Require manufacturer provide qualified personnel to observe field conditions, acceptability of as-built surfaces or work to receive manufacturer's product, quality of installation workmanship, start-up and/or test, balance, adjust manufacturer's equipment or product, and to make appropriate recommendations.

b. Require manufacturer's representative submit written report listing observations and recommendations. Submit to Owner, Architect or Engineer and Contractor within 10 days of manufacturer's field observation.

1.11 TESTING AND INSPECTIONS

A. Provide for, perform or cause to be performed all testing and inspections of the work required by statute and/or by Contract Documents as specified in Section 01415.

B. Provide lighting and acceptable access for inspection as required and as directed.

C. Inspections by Contractor or Subcontractor.

1. Prior to proceeding with the work of each trade, inspect area of installation and status of related work.

2. Report conditions preventing proper execution.

3. Do not proceed in areas adversely affected until deficiencies are corrected.

D. Observations or Inspections by Architect or Engineer: Arrange or schedule specified or requested observations and inspections by Architect or Engineer.

1.12 HORIZONTAL AND VERTICAL CONTROL

A. Provide and pay for field engineering for control of horizontal and vertical layout as required. Field Engineering services performed by the Surveyor/Civil Engineer of record. No substitutions will be accepted.

B. Field Engineering

1. Provide control of horizontal and vertical layout and alignment of site and building(s).

2. Control datum for the Work is that shown on above noted Control Drawings.
   a. Locate and protect established control and reference points, maintain them during construction and, unless indicated otherwise, leave them securely in place upon completion.
   b. Repair, restore or replace established control or reference points displaced as result of Work of the Contract.

3. Layout the Work.
   a. Verify that existing site conditions agree with the grades, elevations, lines and levels shown.
   b. Provide monuments and bench marks as needed for horizontal and vertical control to facilitate installation of the work in compliance with Contract requirements.
   c. Record monuments and bench marks on layout survey drawing.

4. Maintain monuments and bench marks until no longer needed for the work.

5. As each stage of work requiring layout is constructed, perform a survey to determine if the grades, elevations, lines, levels, and vertical alignment, as constructed, comply with Contract requirements.

1.13 MOCKUPS

A. When specified in technical specification section, erect complete, full-scale mockup of assembly at Project site. Remove mockup when Architect/Engineer or Inspector agrees it is no longer needed. Mockups may remain as part of the work only if designed and accepted for such use.

1.14 FIELD FINISHES

A. When specified in technical specification section, provide field installed sample(s) of finish(es). Retain accepted sample(s) until Architect and Owner have accepted the work as matching the sample. Retain sample in completed work only if no joint or break in finish is apparent.

2.00 – PRODUCTS (NOT USED)

3.00 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 41 00
TESTING AND INSPECTION REQUIREMENTS

1.00 – GENERAL

1.01 SUMMARY

A. OWNER will employ and pay for the services of an Independent Testing Laboratory to perform specified testing.

1. CONTRACTOR shall cooperate with the Laboratory and shall in no way relieve CONTRACTOR'S obligation to perform the Work of the Contract.

2. Employment of the Laboratory shall in no way relieve CONTRACTOR'S obligations to perform the Work of the Contract.

1.02 RELATED WORK

A. Related Requirements in other parts of the Project Manual:

1. Inspections and testing required by laws, ordinances, rules, regulations, orders or approval of public authorities: General Conditions.

B. Related Requirements Specified in Other Sections:

1. Certification of Products: The respective section of this Specification.

2. Test, Adjust, and Balance of Equipment: The respective section of this Specification.

3. Laboratory Test Required, and Standards for Testing: The respective sections of this Specification.

1.03 OWNER INSPECTOR

A. An Inspector, employed by the OWNER in accordance with the requirements of the State of California Code of Regulation, Title 24, will be assigned to the Work. His duties are specifically defined in Title 24, Part 1, Section 4-342.

B. The work of construction in all stages of progress shall be subject to the personal continuous observation of the Inspector. He shall have free access to any or all parts of the Work at any time. The CONTRACTOR shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of the materials. Inspection of the Work shall not relieve the CONTRACTOR from any obligation to fulfill this Contract.

1.04 QUALIFICATION OF LABORATORY

A. Meet "Recommended Requirements for Independent Laboratory Qualification," published by American Council of Independent Laboratories.

B. Meet basic requirements of ASTME 329, "Standards for Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction."

1.05 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract Documents.

2. Approve or accept any portion of the Work.

3. Perform any duties of the CONTRACTOR.

1.06 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with Laboratory personnel and provide access to Work and to manufacturer's operations.

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

C. Provide to the Laboratory the preliminary design mix proposed to be used for material mixed which require control by the testing Laboratory.

D. Furnish incidental labor and facilities:

1. To provide access to Work to be tested.

2. To obtain and handle samples at the project site or at the source of the product to be tested.

3. To facilitate inspections and tests.

4. For storage and curing of test samples.

E. Notify Inspector a minimum of 24 hours in advance of operations to allow for Laboratory assignment of personnel and scheduling of tests.

1. When tests or inspections cannot be performed after such notice, reimburse OWNER for Laboratory personnel and travel expenses incurred due to CONTRACTOR'S negligence.

F. Make arrangements through the CONSTRUCTION MANAGER and INSPECTOR and pay for additional samples and tests required for CONTRACTOR'S negligence.

G. Employ and pay for the services of a separate, equally qualified Independent Testing Laboratory to perform additional inspection, sampling and testing required when initial tests indicate Work does not comply with Contract Documents.

H. The OWNER shall pay and back charge the CONTRACTOR for additional testing of all failed tests for this project and special testing required which may be required due to any failed test samples.

I. CONTRACTOR shall pay for all tests and inspections of materials which require testing of material outside of the State for where this Project is constructed to include providing travel expenses, lodging expenses. tools or testing devices, etc., for the testing laboratory personnel.

1.07 SUBMITTALS

A. Furnish copies of reports promptly through the CONSTRUCTION MANAGER for distribution as follows:

1. One copy to CONSTRUCTION MANAGER

2. One copy to ARCHITECT

3. One copy to Structural Engineer

4. One copy to OWNER

5. One copy to the Contractor.

B. Each report shall include, as applicable:

1. Date issued.

2. Project title and number.

3. Testing laboratory name, address, and telephone number.

4. Name and signature of laboratory inspector.

5. Date and time of sampling or inspection.

6. Record of temperature and weather conditions.

7. Date of test.

8. Identification of product and specification section.

9. Location of sample test in the Project.

10. Type of inspection or test.

11. Results of tests and compliance with Contract Documents.

12. Interpretation of test results, when requested by ARCHITECT.

13. All tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported.

14. That the material or materials were sampled and tested in accordance with the requirements of Title 24 and with this Specification.

END OF SECTION

SECTION 01 41 50
TESTING LABORATORY SERVICES

1.00 – GENERAL

1.01 DESCRIPTION

A. Work included:

1. Cooperate with the OWNER'S selected testing and inspection agency and all others responsible for testing and inspecting the Work.

2. Provide such other testing and inspecting as are specified to be furnished by the CONTRACTOR in this Section and/or elsewhere in the Contract Documents.

3. The CONTRACTOR shall be responsible for scheduling this Work and shall notify the Inspector. The Inspector shall notify the testing agency in ample time to permit them to complete their Work.

B. Related Work

1. Documents affecting work of this Section include, but are not necessarily limited to, the Conditions of the Contract and Section in Division 1 of these Specifications.

2. Requirements for testing and inspections as described in Section 01410.

3. Where no testing requirements are described, but the OWNER decides that testing is required, the OWNER may require such testing to be performed under current pertinent standards for testing. Payment for such testing will be made as described in this Section.

C. Work not included:

1. Selection of testing laboratory: The OWNER will select a pre-qualified independent testing laboratory.

2. Payment for initial testing: The OWNER will pay for all initial services of the testing laboratory except as further described in Article 2.1 of this Section.

1.02 QUALITY ASSURANCE

A. The testing laboratory will be qualified to the OWNER'S approval in accordance with ASTM E329, and approved by Architect, Structural Engineer and Division of State Architect.

B. Testing will be in accordance with all pertinent codes and regulations, and with selected standards of the American Society for Testing and Materials.

1.03 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01600.

B. Testing Agency shall promptly process and distribute required copies of test reports and related instructions to assure necessary retesting and replacement of materials with the least possible delay in progress of the Work.

2.00 – PRODUCTS

2.01 PAYMENTS FOR TESTING INVOLVING NON-COMPLIANCE

A. When initial tests indicate non-compliance with the Contract Documents, the costs of subsequent tests as well as costs of subsequent retesting occasioned by the non- compliance will be paid by the OWNER and the amount deducted from the Contract sum.

B. Local legally constituted public authorities having jurisdiction over this construction and the OWNER or their designated representative shall be the only authorized persons empowered to direct tests to be made when it appears to be necessary to determine compliance or non-compliance to the requirements of the Work.

2.02 SPECIFIC TESTS AND INSPECTIONS

A. Provide all tests and inspections required by 2016 C.B.C., with 2016 California Amendments, Title 24, Part 1, and Title 24, Part 2, Chapters 19 and 22 and Specification Standards for Public Works, required by provisions of the Contract Documents, and such other tests and inspections as are dictated by the ARCHITECT.

B. Tests include, but are not necessarily limited to, those described in detail in Part 3 of this Section.

2.03 PAYMENTS FOR TESTING AND INSPECTIONS - GENERAL

A. Except for tests involving non-compliance or defective materials, and special conditions herein specified, the cost of tests and inspections will be borne by the OWNER as required by Title 24, C.C.R. These shall include but not be limited to:

1. Concrete mix design.

2. Structural Steel Material Lists.

3. Structural Steel welding.

4. Earthwork Compaction tests.

5. Concrete compression tests.

6. Concrete block test.

7. Mortar and grout compression tests. (If required)

B. For tests, inspections and services involving the following, the amount will be paid for by the OWNER and deducted from the Contract sum;

1. Any added costs due to failure in scheduling tests and inspections.

2. Any added costs due to failure of original materials to meet Specification requirements or due to defective workmanship.

3. The costs of test or inspections ordered especially by authorized persons for the purpose of proving the existence of faulty materials or workmanship, if same is proved faulty, shall be borne by the CONTRACTOR. If faulty conditions are not proved from such tests or inspections, the cost of same will be paid for by the OWNER.

C. Direct payments by the CONTRACTOR to a testing agency is expressly prohibited by code.

D. If the CONTRACTOR elects to change source of concrete and/or aggregates after said mix has been established, the CONTRACTOR shall reimburse the OWNER for all costs incurred in the re-testing of the aggregates and the re-design of the mix.

3.00 – EXECUTION

3.01 TAKING SPECIMENS

A. All specimens and samples for testing, unless otherwise provided in the Contract Documents, shall be taken by the testing personnel. All sampling equipment and personnel will be provided by the testing laboratory. All deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

3.02 COOPERATION WITH TESTING LABORATORY

A. Provide access to the Work at all times and at all locations where the Work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.

3.03 OWNER NOTIFICATION

A. The CONTRACTOR shall notify the OWNER'S representative a sufficient time in advance of the manufacture of material to be supplied by him under the Contract Documents, which must by terms of the Contract be tested, in order that the OWNER may arrange for the testing of same at the source of supply.

B. Any materials and samples furnished and/or shipped by the CONTRACTOR from the source of supply and/or any other source prior to having satisfactorily passed such testing and inspection by the Testing Engineer or Laboratory or prior to the receipt of notice from said representative that such testing and inspection will not be required, shall not be incorporated in the job without the express written approval of the OWNER.

3.04 TEST REPORTS

A. Two copy of all test reports shall be forwarded to the Division of the State Architect by the testing agency. Such reports shall include all tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. The reports shall show that the material or materials were sampled and tested in accordance with the requirements of Title 24 and with the approved specifications. Test reports shall show the specified design strength. They shall also state definitely whether or not the material or materials tested comply with requirements of the Contract Documents.

B. The reports will be distributed as follows:

ARCHITECT	1 Copy
STRUCTURAL Engineer	1 Copy
CONSTRUCTION MANAGER/OWNER	1 Copies
CONTRACTOR	2 Copies

C. The reports shall state that the tests were made under the responsible charge of a testing engineer holding a license to practice civil engineering in the State of California; that the material and/or materials were tested in accordance with the provisions of these Specifications and Title 24, Part 2, C.C.R., and that the material and/or materials tested passed or failed to pass the requirements of these Specifications.

D. Upon completion of the building or buildings, the testing laboratory shall deliver a certificate to the Office of the State Architect, certified to in the presence of a notary public, stating that the tests for this Work were made in accordance with the provisions of these Specifications and with the provisions of Title 24, Part 2, C.C.R., and further, that all such tests and reports were made for the job reported.

3.05 VERIFICATION OF TEST REPORTS

A. Each testing agency shall submit to the Division of the State Architect a verified report in duplicate covering all of the tests which are required to be made by that agency during the progress of the Project. Such report shall be furnished each time that work on the Project is suspended, covering the tests up to that time, and at the completion of the project, covering all tests.

3.06 SOIL INSPECTING, TESTING, EXCAVATING, FILL INSPECTION FOR FOUNDATION.

A. The Soils Engineer shall make required inspections and tests including, but not l limited to:

1. Visually inspect on-site and imported fill and backfill, making such tests and retests as are necessary to determine compliance with the Contract requirements and suitability for the proposed purpose;

2. Make field density tests on samples from in-place material as required;

3. As pertinent, inspect and test the scarifying and recompacting of cleaned subgrade; inspect the progress of excavating, filling, and grading; make required specified density tests at fills and backfills; and verify compliance with provisions of the Contract Documents and governmental agencies having jurisdiction.

B. Make and distribute necessary reports and certificates.

3.07 CONCRETE TESTING AND INSPECTIONS

A. General: Concrete Testing and Inspection shall comply with the following.

B. Portland cement:

1. Secure from the cement manufacturer Certificates of Compliance delivered directly to the concrete producer for further delivery directly to the testing laboratory.

2. Require the Certificates of Compliance to positively identify the cement as to production lot, bin or silo number, dating and routing of shipment, and compliance with specified standards.

3. If so required by the ARCHITECT, promptly provide such other specific physical and chemical data as requested.

4. One sample shall be taken for each 100 tons of cement except that when used in bulk loading ready mix plants where separate bins for pre-tested cement are not available, grab samples shall be taken for each shipment of cement placed in the bin with not less than one sample being taken for each day's pour and such samples shall be subsequently tested in accordance with Sec. 2628(a) if required by the ARCHITECT, Structural Engineer or the Division of the State Architect.

C. Aggregate:

1. Provide one test unless character of material changes, material is substituted, or additional test is requested by the ARCHITECT.

2. Sample from conveyor belts or batching gates at the ready-mix plant:

   a. Sieve analysis to determine compliance with specified standards and grading;

   b. Specific gravity test for compliance with specified standards.

D. Laboratory design mix:

1. After acceptance of aggregate, and whenever character or source of materials is changed, provide mix design in accordance with ACI 613.

2. Provide designs for all mixes prepared by a licensed Civil Engineer registered in the State of California.

E. Molded concrete cylinders:

1. Provide three test cylinders for each 50 cu yd., or fraction thereof, of each class of concrete of each day's placement.

2. Test one cylinder at seven days, one at 28 days, and one when so directed.

3. Report the mix, slump, gage, location of concrete in the structure, and test results.

4. Take specimens and make tests in accordance with the applicable ASTM standard specifications.

F. Core tests:

1. Provide only when specifically so directed by the ARCHITECT because of low cylinder test results.

2. Cut from locations directed by the ARCHITECT, securing in accordance with ASTM C42, and prepare and test in accordance with ASTM C39.

3. Cores shall be of a diameter determined by the Testing Laboratory but no less than 4" in diameter.

G. Placement inspections:

1. Placement of concrete shall be inspected by the OWNER'S Inspector.

2. Throughout progress of concrete placement, make slump tests to verify conformance with specified slump.

3. Using all required personnel and equipment, throughout progress of concrete placement verify that finished concrete surfaces will have the level or slope that is required by the Contract Documents.

4. A project record shall be kept on the time and date of placing concrete in each portion of the structure. Such record shall be kept until the completion of the structure and shall be open to inspection by the Division of the State Architect.

H. Batch plant inspections:

1. The quality and quantity of materials used in transit mixed concrete and in batched aggregate shall be continuously inspected at the location where materials are measured by a specifically approved inspector.

3.08 MORTAR AND GROUT TESTS

A. At the beginning of all masonry work, at least one test sample of the mortar and grout shall be taken on three successive working days and at least one week intervals thereafter. The samples shall be continuously stored in moist air until tested. They shall meet the minimum strength requirement given in Sec. 2103A.3 & A.4 and (d) for mortar and grout, respectively.

B. Additional samples shall be taken whenever any change in materials or job conditions occur, or whenever in the judgment of the ARCHITECT, Structural Engineer or the Division of the State Architect, such tests are necessary to determine the quality of the material.

3.09 CONCRETE REINFORCEMENT INSPECTION AND TESTING

A. Prior to use, test all reinforcement steel bars for compliance with the specified standards.

1. Where samples are taken from bundles delivered from the mill, with the bundles identified as to heat number, and provided the mill analysis to accompany the report, then, one tensile test and one bend test shall be made on a specimen from each 10 tons or fraction thereof for each size of reinforcing steel.

2. Tag identified steel at the supplier's shop. When steel arrives at the job site without such tags, test it as unidentified steel.

B. Unidentified Steel:

1. Have the testing laboratory select samples consisting of two pieces, each 18" long, of each size.

2. Have the testing laboratory make one tensile test and one bend test for each 2-1/2 tons or fraction thereof of each size of unidentified steel.

3. Costs of tests for unidentified steel will be paid by the OWNER and deducted from the Contract sum.

C. Provide continuous inspection for all welding of reinforcement steel.

3.10 STRUCTURAL STEEL INSPECTING AND TESTING

A. Prior to use, test all structural steel for compliance with the specified standards.

1. Material identified by mill test reports and certified by the testing laboratory, does not require additional testing. Require the supplier to furnish mill test reports to the laboratory for certification.

2. Tag identified steel at the supplier's shop in accordance with Sec. 2203A (b), Title 24, C.C.R. When steel arrives at the job site without such tags, test it as unidentified steel.

B. Unidentified steel:

1. Have testing laboratory make one tensile test and one bend test for each five tons or fraction thereof of each shape and size of unidentified structural steel.

2. Costs of tests for unidentified steel will be paid by the OWNER and deducted from the Contract sum.

C. Welding inspection: Inspection of all shop and field welding operations shall be made by a qualified welding inspector, approved by the Division of the State Architect. The OWNER will pay for the cost of such inspections. Welding inspection procedures shall conform to Section 2231.A.5, Title 24, C.C.R.

D. Fabrication inspection: Where fabrication is done on the premises of a fabricator, the entire cost of fabrication inspection will be paid by the OWNER, and the amount deducted from the contract sum.

3.11 SCHEDULES FOR TESTING

A. Establishing schedule:

1. By advance discussion with the testing laboratory selected by the OWNER, determine the time required for the laboratory to perform its tests and to issue each of its findings.

2. Provide all required time within the construction schedule.

B. Adherence to schedule: When the testing laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra charges for testing attributable to the delay may be back-charged to the CONTRACTOR and shall not be borne by the OWNER.

3.12 INSPECTION BY THE OWNER

A. The OWNER or CONSTRUCTION MANAGER shall at all times have access to the shops where in Work is being fabricated or assembled and inspection is required. The CONTRACTOR shall provide safe access for such inspection.

3.13 OWNER'S INSPECTOR

A. An inspector employed by the OWNER in accordance with the requirements of California Code of Regulations, Title 24, Part 1, will be assigned to the Work. His duties are specifically defined in Article 6, Section 4-342 of Title 24, Part 1, C.C.R. The work of construction in all stages of progress shall be subject to the personal continuous observation of the Inspector. He shall have free access to any or all parts of the Work at any time. The CONTRACTOR shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of the materials. Inspection of the work shall not relieve the CONTRACTOR from any obligation to fulfill this Contract. The Inspector and/or OWNER shall have authority to stop the Work whenever the provisions of the Contract Documents are not being complied with and the CONTRACTOR shall instruct his employees accordingly.

B. All overtime costs required for Testing & Inspection shall be paid by OWNER and deducted from monies due the CONTRACTOR.

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES

1.00 – GENERAL

A. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein, and as necessary to complete the Contract.

1.01 SAFETY

A. Guard machinery, equipment, and all hazards in accordance with the safety provisions of the latest edition of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable law. Protect all hazards with adequately constructed guard rails or barricades and provide lanterns, warning lights, and the like, as necessary. Eliminate all attractive nuisance from the work and the room site. To this end, dispose, store, guard, and protect the premises and all work materials, equipment and both permanent and temporary construction so as to preclude the unauthorized use thereof by children or others and particularly to eliminate possible consequent injury to all persons.

B. Structural design of all items used in the construction of the building and not a permanent part thereof, including, shoring for concrete and masonry work, the temporary bracing for structural steel, and the shoring of cut earth banks, its the sole responsibility of the Contractor.

1.02 SCAFFOLDING AND HOISTS

A. Furnish and maintain hoists, staging, rigging, scaffolding, and runways required in the prosecution of the work. Erect, equip and maintain such temporary work in accordance with statutes, laws, ordinances, rules or regulations of the State of California or other authorities and Insurance Companies having jurisdiction.

1.03 DUST CONTROL

A. During the life of the Contract, provide effective means of dust control both within the structure and on the surrounding site. Obtain the Architect's approval before use of any means except water.

1.04 MAINTENANCE OF TRAFFIC

A. Maintain traffic on all streets adjacent to or leading to the site. Where construction operations interfere with the free movement of traffic, provide traffic controls, flagmen or similar devices to efficiently control traffic movement. Provide a traffic control permit from the local authorities if required.

1.05 DEWATERINGS

A. Furnish and maintain all pumps or other dewatering devices where may be required by this work.

1.06 PROJECT OFFICE

A. Provide and maintain, for the duration of the Contract, a project office, complete with heat, light, ventilation and convenience outlets. The office shall be of sufficient size for the Contractor's personnel and operators and shall provide desk space for use of the Architect and for inspection personnel.

1.07 TELEPHONE AND DATA

A. Provide and pay for all necessary temporary telephones, Fax machine and computer data lines. Maintain telephones, Fax machine and data lines in continuous service on the project site during the course of the work and make available at all times, free and unrestricted, to the Architect's and Owner's representative for their use in direct connection with the work.

1.08 TEMPORARY TOILETS

A. Provide temporary toilets facilities for all personnel employed on the project. Maintain toilets in a clean and sanitary condition at all times. Remove at project completion.

1.09 CONSTRUCTION WATER AND POWER

A. Make arrangements for all water and power required for the project. Provide all temporary lines. The Owner pay for the monthly charges. Remove temporary facilities at project completion.

1.10 FENCES AND BARRICADES

A. Around the construction site, erect fences and barricades as required by local governing authorities. Maintain in good condition until completion of the project.

1.11 JOB SIGN DESCRIPTION

A. Furnish and erect on 96" x 48" job sign, painted and lettered to identify the project, the Architect, and the Contractor. Mount on posts and brace as indicated by the Architect. Sign shall be lettered by a professional sign painter, and the layout shall be as indicated by the Architect.

END OF SECTION

SECTION 01 60 00
MATERIAL, EQUIPMENT AND PRODUCT HANDLING

1.00 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. Products.

B. Proprietary Specifications.

C. Scheduling.

D. Coordination.

E. Manufacturer Requirements.

F. Manufacturers' Warranties.

G. Delivery and Off-loading.

H. Handling and Inspection.

I. Storage and Protection.

1.02 RELATED REQUIREMENTS

A. Information for Bidders: Owner-furnished Products, if any.

B. Section 01 30 00 - Submittals: Scheduling submittals.

C. Section 01 34 00 - Shop Drawings, Product Data and Samples: Submittal requirements and procedures.

D. Section 01 40 00 - Quality Control.

1. Manufacturers Instructions.

2. Manufacturers Certificates.

3. Reference Standards.

E. Section 01 63 00 - Product Options and Substitutions.

F. Section 01 70 00 - Contract Closeout.

G. Section 01 73 00 - Operating and Maintenance Data.

H. Section 01 74 00 - Warranties.

1.03 PRODUCTS

A. Definition.

1. "Products" is defined in Section 01 63 00.

2. "Products" includes in its meaning materials, manufactured items, assemblies, equipment, systems, processes and procedures installed or to be installed in the Work.

B. Minimum Requirements.

1. Products, characteristics and performance as specified in contract documents.

2. Reference Standards as specified in Section 01 40 00.

C. Provide only products complying with contract requirements.

D. Replace non-conforming products.

E. Supply interchangeable components of single manufacture when contract documents require multiple numbers of an item.

F. Products shall be new unless otherwise indicated.

G. Electrical components of products and their total assembly within products shall be UL tested, listed and labeled.

H. Products supplied under Allowance: As indicated.

I. Products furnished by Owner: As indicated.

1.04 PROPRIETARY SPECIFICATIONS

A. Furnish products specified in proprietary manner, as by trade name, model number, manufacturer, vendor or unique combination of characteristics, whether or not followed by an "or (approved) equal" clause, unless a substitution has been authorized as specified in Section 01 63 00.

B. Determination of equivalency is not a Contractor's option.

1.05 SCHEDULING

A. Schedule as specified in Section 01 31 00: Submittal of shop drawings, product data and samples in manner indicated in Section 01 34 00.

1.06 COORDINATION

A. Coordinate the interrelationship of the various products in the manner indicated.

1.07 MANUFACTURER REQUIREMENTS

A. When specified, require manufacturers or suppliers to provide the following:

1. Written certification of product conformity in the manner indicated in Section 01 41 00.

2. Drawings, product data, samples, mock-ups, in the manner indicated in Section 01 34 00.

3. Written instructions and recommendations concerning installation of their product in the manner indicated in Section 01 63 00.

4. Operation and maintenance data in the manner indicated in Section 01 73 00.

1.08 MANUFACTURER'S WARRANTIES

A. Provide warranties as specified in Section 01 74 00.

1.09 TRANSPORTATION AND OFF-LOADING

A. Transport products using methods to avoid product damage. Contractor is responsible for replacement of damaged products at his expense.

B. Deliver in dry and undamaged condition in manufacturer's unopened containers or packaging.

C. Off-load products generally in manner specified for handling.

1.10 HANDLING AND INSPECTION

A. Provide equipment and personnel to handle products using methods to prevent damage or soiling.

B. Promptly inspect shipments to assure that products comply with contract requirements, quantities are correct, and products are undamaged.

1.11 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.

B. Store sensitive products in weather-tight enclosures maintained within temperature and humidity ranges recommended by manufacturer's.

C. For exterior storage of fabricated products, place on sloped supports above ground.

1. Cover products subject to deterioration with impervious sheet covering.

2. Provide ventilation to avoid condensation.

D. Store loose granular materials on solid surfaces in a well-drained area.

1. Prevent mixing with foreign matter.

E. Arrange storage to provide access for inspection.

F. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

G. After installation, provide coverings to protect products from damage from construction traffic and operations. Remove when no longer needed.

2.00 – PRODUCTS (NOT USED)

3.00 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 63 00
PRODUCT OPTIONS AND SUBSTITUTIONS

1.00 – GENERAL

1.01 WORK INCLUDE

A. Whenever in the Specifications any material, article or process is indicated or specified by trade, patent, or proprietary name or name of manufacturer, such specification shall be deemed to be followed by the words, "Or equal, as approved in writing by the ARCHITECT", except as noted.

B. Where more than one proprietary name is specified, the CONTRACTOR may provide materials or equipment of any one of the manufacturers specified, only if full compliance with other portions of the Specification can be provided.

1.02 MATERIALS

A. Unless otherwise specifically provided in this Contract, all equipment, material, and articles incorporated into the Work of this Contract shall be new and suitable for the purpose intended.

B. Reference to any equipment, material, article or patented process, by trade name, or catalog number shall not be construed as limiting competition. In those cases where the Specifications designate a material, product, thing or service by specific brand or trade name and there is only one brand or trade name listed, the item involved is:

1. Required to be used since it is a unique or novel product application.

2. Used as a standard of quality which must be satisfied without compromise.

3. The only brand or trade name known to the OWNER and ARCHITECT.

C. Construction shall be in compliance with the equivalent Report for the material specified.

1.03 SUBSTITUTIONS

A. Should the CONTRACTOR wish to substitute an item he considers equal to the one specified, he must, within **fourteen (14)** calendar days after issuance of Letter of Intent, furnish to the ARCHITECT through the CONSTRUCTION MANAGER, on the form provided, the name of the manufacturer, the model number, and other pertinent data and information respecting the "or equal" item which has been proposed in is bid and which the CONTRACTOR contemplates incorporating in the Work. If the "or equal" item is not founded by the ARCHITECT to be in fact, equal or better, the CONTRACTOR must resubmit within five (5) calendar days an alternate product.

B. When required by this Contract or when called for by the OWNER, the CONTRACTOR shall furnish full information concerning the material or articles which he contemplates incorporating in the Work. Testing of a proposed substitute material to assure compliance with the Specifications may be required by the OWNER at the CONTRACTOR'S expense. When so directed, samples shall be submitted for approval. Equipment, material, and articles installed or used without required approval shall be at the risk of subsequent rejection. Where additional D.S.A. review is required for substitution of items beyond standard of the industry, CONTRACTOR shall pay the OWNER for all additional costs.

C. Substitutions shall, without exception, be manufactured of the most basic materials and shall comply with or exceed all specifications, requirements of dimensions, function, structure, durability, and appearance of Product specified in the Contract Documents. Use of approved substitutions shall in no way relieve the CONTRACTOR from responsibility for compliance with the Drawings and Specifications using approved substitutions to assume all extra costs caused by the use of such substitutions where they affect other work or trades.

D. Failure to place orders for specified equipment or material sufficiently in advance of his schedule date of installation will not be considered as a valid reason upon which the CONTRACTOR may base his request for any substitutions, additional time, or for any deviations from the Drawings and Specifications.

E. In the event the CONTRACTOR requests changes or revisions requiring drawings or services of the ARCHITECT or his consultants to facilitate installation or erection of any portion of the Work, he shall accept the responsibility to hire, and pay for the consultant's services. A flat hourly rate, as agreed upon, shall be paid by the CONTRACTOR whether the change is approved or rejected. In the event the change is approved, this fee shall be deducted, and paid, from the CONTRACTOR'S portion of the saving. Items submitted which require Division of State ARCHITECT'S (D.S.A.) approval(s) the CONTRACTOR shall pay for all plan check fees or fees required to obtain their approvals and in addition to, the CONTRACTOR shall pay the ARCHITECT and his Consultants for all services rendered for drawings, calculations, review time, plan check time for each substitute item(s) for approval(s).

(See attached Substitution Request Form)

END OF SECTION

SUBSTITUTION REQUEST FORM

TO:_____

PROJECT:_____

SPECIFIED ITEM:

_____

Section Page Paragraph Description

The undersigned requests consideration of the following:

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 a description of changes to the Contract Documents which the proposed substitution will require for its proper installation.

The undersigned certifies that the following paragraphs, unless modified by attachments are correct:

1. The proposed substitution does not affect dimensions shown on 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 affect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.
5. The proposed substitution is submitted within seven (7) calendar days after issuance of the Notice of Intent to Award.

The undersigned further states that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified item.

Submitted by: _____ (For use by the design consultant:)

Signature _____ ___ Accepted ___ Accepted as noted

Firm _____ ___ Not Accepted ___ Received too late

Address _____ By _____

_____ Date _____

Date _____ Remarks_____

Telephone _____ Attachments:

Fax: _____

SECTION 01 70 00
CONTRACT CLOSEOUT

1.00 – GENERAL

1.01 SECTION INCLUDES

A. Closeout procedures

B. Final cleaning

C. Adjusting

D. Project record documents

E. Operation and maintenance data

F. Warranties

G. Spare parts and maintenance materials

H. Instructions to Personnel

1.02 CLOSEOUT PROCEDURES

A. All close-out data to be submitted no later than 10 days of completion of construction schedule. Parties agree that delays to Punch List and Close-out would constitute a delay in Project completion and, therefore, entitles Owner to withhold and retain potential liquidated damages per the Contract Documents from Contractor's progress payments.

B. Partial Occupancy and substantial Completion - Each Contractor shall:

1. Conform to Part 1, Title 24, Section 4-336 CCR, Requirements for Verified Reports and Close-out Procedures.

2. In conjunction with the Project Inspector, prepare a list of items to be completed or corrected. List may be developed by areas, when approved by the ARCHITECT.

3. Within a reasonable time after receipt of the list, the ARCHITECT and the CONSTRUCTION MANAGER will inspect to determine status of completion.

4. Should the ARCHITECT determine that Work is not substantially complete:

a. The ARCHITECT through the CONSTRUCTION MANAGER will promptly notify the CONTRACTOR in writing, giving the reason for his determination.

b. CONTRACTOR shall remedy the deficiencies and notify the CONSTRUCTION MANAGER when the Work is ready for re-inspection.

c. The ARCHITECT and CONSTRUCTION MANAGER will re-inspect the Work.

5. When the ARCHITECT and the CONSTRUCTION MANAGER concur that work is substantially complete
   a. The ARCHITECT will prepare a "Certificate of Substantial Completion" on AIA Form G704, accompanied by the CONTRACTOR'S list of items to be completed or corrected as verified by the ARCHITECT.
   b. The ARCHITECT will submit the Certificate to the OWNER and to the CONTRACTOR for their written acceptance of the responsibilities assigned to them in the Certificate.

C. Final Completion - Each Contractor shall:

1. Prepare and submit a notice that Work is ready for final inspection and acceptance.

2. Verify the Work is complete.

3. Certify that:
   a. Work has been inspected by all governing agencies and is in compliance with Contract Documents,
   b. Work has been inspected for compliance with the Contract Documents.
   c. Work has been completed in accordance with the Contract Documents.
   d. Equipment and systems have been tested as required and are operational.
   e. Work is completed and ready for final inspection.

4. The ARCHITECT and CONSTRUCTION MANAGER will make an inspection to verify status of completion.

5. Should the ARCHITECT determine the Work is incomplete or defective work.
   a. The ARCHITECT and the CONSTRUCTION MANAGER will promptly notify the CONTRACTOR in writing, listing incomplete or defective Work.

   b. CONTRACTOR shall remedy the deficiencies promptly and notify the ARCHITECT and CONSTRUCTION MANAGER when ready for reinspection.

6. When the ARCHITECT determines the Work is acceptable under the Contract Documents, he will request the CONTRACTOR to make close-out submittals.

D. Closeout submittals include, but are not necessarily limited to - Each Contractor shall:

1. Project Record Documents

2. Operation and maintenance data for items so listed in pertinent Sections these Specifications and for other items when so approved by the ARCHITECT and CONSTRUCTION MANAGER.

3. Warranties

4. Keys and keying schedule.

5. Spare parts, materials, extra stock to be turned over to the OWNER.

6. Evidence of compliance with requirements of governmental agencies having jurisdiction, including, but not limited to:
   a. Date of final inspection and list of persons in attendance.
   b. List of any items that do not conform to the Contract Documents.
   c. Certificates of Inspection.
   d. Certificates of Occupancy.

7. Evidence of payment and release of liens, when requested by the OWNER.

8. List of SUBCONTRACTORS, service organizations and principal vendors including names, addresses and telephone numbers, when contacted for emergency service at all times, including nights and holidays.

E. Final Payment - Each Contractor shall:

1. Submit a Final Payment Request, showing all adjustments to the Contract Sum.

2. Retention will be released no sooner than 35 days after Notice of Completion has been filed with the Owner, and the Owner has complied with County recording requirements.

1.03 FINAL CLEANING (See Section 01710)

A. Execute final cleaning prior to final inspection.

B. Clean glass and surfaces exposed to view; remove temporary labels, stains and foreign substances.

C. Polish transparent and glossy surfaces.

D. Vacuum carpeted and soft surfaces.

E. Wax and polish resilient floor surfaces.

F. Wash and polish ceramic surfaces.

G. Clean machinery equipment.

H. Clean plumbing fixtures to a sanitary condition. Use non-corrosive, non-abrasive cleaning materials. Replace filters of operating equipment.

I. Clean and polish light fixtures.

J. Clean and polish hardware and metal surfaces.

K. Clean walls and ceilings of dust, dirt, stains, handmarks, paint spots, plaster drops and like defects.

L. Clean construction site; sweep paved areas, rake clean all landscaped surfaces.

M. Clean out and flush all drains from all construction debris, flood test prior to occupancy.

N. Remove waste and surplus materials, rubbish, and construction facilities from the site. Do not use own OWNER'S waste removal system or any system belonging to OWNER of adjacent properties.

1.04 ADJUSTING - Each Contractor shall:

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.05 RECORD DOCUMENTS - Each Contractor shall:

A. OWNER will provide one set of blueline OR blackline drawings and one copy of the Project Specification for use during construction to record changes made during construction.

B. Record in concise and neat manner and on a weekly basis all actual revisions to the work:

1. Changes made on the Drawings, including Clarification Drawings.

2. Changes made to the Specifications.

3. Changes made by Addenda.

4. Changes made by Instruction Bulletins.

5. Change Orders or other authorized Modifications to the Contract.

6. Revisions made to shop drawings, product data and samples.

C. Store Record documents separate from documents used for construction. Replace soiled or illegible documents.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name, trade name, Product model and number and supplier.

2. Authorized product substitutions or alternates utilized.

3. Changes made by Addenda and Modifications.

F. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first floor.

2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Identify drains and sewers by invert elevation.

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work. Identify ducts, dampers, valves, access doors and control equipment wiring.

4. Field changes of dimension and detail.

5. Details not on original Drawings.

G. Obtain Inspector's signed certification that Record Documents have been fully updated prior to submitting monthly payment requests. Compliance is mandatory before payment will be made.

H. Submit Inspector's certified documents to CONSTRUCTION MANAGER with claim for final Application of Payment. Fully complete record drawings are a prerequisite to final payment.

I. The OWNER requires the preparation of a final reproducible 'RECORD SET' of drawings. The record set shall incorporate all changes made during the construction process including all change orders, addenda, field orders and "As Built' conditions noted on the CONTRACTOR'S prepared record documents.

1. Contractor shall continuously maintain a separate set of drawings on site, according to items 1.05 A-H above.

2. At the end of the project, submit the marked-up blueline record drawings signed by the Contractor authorized representative and transmit to the Construction Manager.

3. Construction MANAGER, Inspector, and Architect shall review the blueline record drawings requesting contractor changes as required.

4. Architect will take the record drawing blue lines and transfer data onto the Architect's office originals.

5. Architect will then make a reproducible set of the originals using four (4) millimeter vellum. The vellums plus one set of bluelines will be sent to the Owner.

1.06 OPERATION AND MAINTENANCE DATA

A. See Section 01730 for procedure

B. Submit One copy of completed volumes in final form prior to final inspection. This copy will be returned with ARCHITECT comments. Revise content of documents as required prior to final submittal.

C. Submit final volumes revised within ten days after final inspection.

1.07 WARRANTIES, GUARANTEES AND BONDS

A. See Section 01740 for procedure.

B. Submit prior to final Application for Payment.

C. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.08 SPARE PARTS AND MAINTENANCE MATERIALS - Each Contractor shall:

A. Provide products; spare parts, maintenance and extra materials in quantities specified in individual specification Sections.

1.09 INSTRUCTIONS TO OWNER PERSONNEL

A. Instruct the OWNER personnel in proper operation and maintenance of all systems, equipment and similar items which were provided as part of the Work.

B. CONTRACTOR shall provide a schedule to the OWNER for approval for each of the instruction periods required.

1. Organize the instruction sessions into group sizes and schedule the elapsed time for instruction in a manner to Provide complete coverage of the subject matter, prior to occupancy.

C. Instruction sessions will be held in a OWNER designated area on the project site and CONTRACTOR to coordinate date and time with CONSTRUCTION MANAGER and OWNER.

D. Instructions shall be qualified by the product manufacturer in the subject matter presented at each session.

1. Submit names of instructors and qualifications to the ARCHITECT, CONSTRUCTION MANAGER, and OWNER for approval, 30 days prior to each scheduled session.

2. Substitution of instructors will not be permitted without prior approval of ARCHITECT, CONSTRUCTION MANAGER and OWNER.

2.00 – PRODUCTS (NOT USED)

3.00 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 71 00
CLEANING

1.00 – GENERAL

1.01 SUMMARY

A. Section Includes: Cleaning throughout the construction period, and final project cleaning prior to the acceptance tour.

B. Related Work Described Elsewhere: In addition to standards specified herein, comply with requirements for cleaning up as described in other sections of these Specifications.

1.02 QUALITY ASSURANCE

A. Inspection: Conduct daily inspection, and more often if necessary to verify that requirements of cleanliness are being met.

B. Codes and Standards: In addition to the requirements specified herein, comply with pertinent requirements of authorities having jurisdiction.

2.00 – PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

A. Use cleaning materials and equipment, which are compatible with the surfaces being cleaned, as recommended by the manufacturer of the material to be cleaned.

3.00 – EXECUTION

3.01 PROGRESS CLEANING

A. General

1. Retain stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.

2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this work. Debris shall be removed from the site and disposed of in a lawful manner. Disposal receipts or dump tickets shall be furnished to the Project Manager upon request.

3. At least twice each month, and more often if necessary, remove scrap, debris, and waste material from the job site.

4. Provide adequate storage for items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

B. Site

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove items to the place designated for their storage. Combustible waste shall be removed from the site. Flammable waste shall be kept in sealed metal containers until removed from the site.

2. Weekly, and more often if necessary, inspect, arrangements of materials stored on the site; restack, tidy, or otherwise service arrangements to meet the requirements specified above.

3. Maintain the site in a neat and orderly condition.

C. Structures

1. Weekly, and more often if necessary, inspect the structures and pick up scrap, debris, and waste material. Remove items to the place designated for their storage.

2. Weekly, and more often if necessary, sweep interior spaces clean.

a. “Clean”, for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a handheld broom, i.e., ‘broom-clean”.

3. As required preparatory to installation of succeeding materials, clean the structures of pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the required cleanliness.

4. Following the installation of finish floor materials, clean the finish floor daily, and more often if necessary, and while work is being performed in the space in which finish materials have been installed.

a. “Clean”, for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Project Manager, may be injurious to the finish floor material, i.e., “vacuum clean”.

3.02 FINAL CLEANING

A. Definition: Except as otherwise specifically provided, “clean”, for the purpose of the Article, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials, i.e., “scrub and polish clean”.

B. General: Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste, conduct final progress cleaning as described above.

C. Site: Unless otherwise specifically directed by the Project Manager, water and broom clean paved areas on the site and public paved areas directly adjacent to the site. Remove resultant debris.

D. Structures:

1. Exterior: In areas affected by the work under this contract, visually inspect exterior surfaces and remove traces of soil, waste material, smudges, and other foreign matter. Remove traces of splashed material from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure.

2. In the event of stubborn stains not removable with water, the Project manager may require light sandblasting or other cleaning at no additional cost to the Owner.

3. Interior: In areas affected by the work under this contact, visually inspect interior surfaces and remove traces of soil waste material, smudges, and other foreign matter. Remove traces of splashed materials from adjacent surfaces. Remove paint drippings, spots, stains, and dirt from finished surfaces. Use only the cleaning materials and equipment instructed by the manufacturer of the surface material. Vacuum carpeted and soft surfaces. Wax and polish resilient floor surfaces. Wash and polish ceramic surfaces. Clean machinery equipment. Clean plumbing fixtures to a sanitary condition. Use non-corrosive, non-abrasive cleaning materials. Replace filters of operating equipment. Clean and polish light fixtures. Clean and polish hardware and metal surfaces.

4. Glass: Clean glass inside and outside.

5. Polished Surfaces: On surfaces requiring the routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished. Glossy surfaces shall be cleaned and shined as intended by the manufacturer.

E. Timing: Schedule final cleaning as accepted by the Project manager to enable the Owner to accept a completely clean project.

3.03 CLEANING DURING THE OWNER'S OCCUPANCY

A. Should the Owner occupy the work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, the Project Manager in accordance with the General Conditions of the Contract shall determine responsibilities for interim and final cleaning of the occupied spaces.

END OF SECTION

SECTION 01 73 00
OPERATING AND MAINTENANCE DATA

1.00 – GENERAL

1.01 WORK INCLUDED

A. Work includes the following:

1. Compilation of product data and related information appropriate for Owner's maintenance and operation of products furnished under the Contract.

2. Instruction of Owner's personnel in the maintenance of products and in the operation of equipment and systems.

1.02 RELATED WORK

A. Related Work Specified Elsewhere:

1. Section 01340 - Shop Drawings, Product Data and Samples.

2. Section 01700 - Contract Close-out.

1.03 QUALITY ASSURANCE

A. Preparation of data shall be done by personnel:

1. Trained and experienced in maintenance and operation of the described products.

2. Familiar with requirements of the Section specified.

3. Skilled in technical writing to the extent required to communicate essential data.

4. Skilled as draftsmen competent to prepare required drawings.

1.04 SUBMITTALS

A. Comply with pertinent provisions of Section 01300.

B. Preliminary: Submit two copies of a preliminary draft of the proposed Manual or Manuals to the CONSTRUCTION MANAGER for ARCHITECT review and approval.

1. Show general arrangement, nature of contents in each portion, probable number of drawings and their size, and proposed method of binding and covering.

2. Secure the Architect's approval through the CONSTRUCTION MANAGER prior to proceeding.

C. Final: Complete the Manuals in strict accordance with the approved preliminary drafts and the Architect's review comments.

1. Submit three copies of the final Manual to the Architect through the CONSTRUCTION MANAGER at least TEN (10) days prior to final inspection or acceptance.

D. Revisions:

1. Following the indoctrination and instruction of operating and maintenance personnel, review all proposed revisions of the Manual with the Architect.

2. Submit specified number of copies of approved data in final form ten (10) days after final inspection or acceptance.

2.00 – PRODUCTS

2.01 INSTRUCTION MANUALS

A. Prepare data in the form of an instructional manual for use by Owner's personnel.

B. Format:

1. Size: 8-1/2 inches by 11 inches.

2. Paper: 20 pound minimum, white, for typed pages.

3. Text: Manufacturer's printed data, or neatly type-written.

4. Drawings:
   a. Provide reinforced punched binder tab. Bind drawings in with text.
   b. Fan fold larger drawings to the size of the text pages, for easy fold out.
   c. Photographically reduce larger drawings, if necessary, to fit binder. Maintain readability.

5. Fly-leaf for each separate product, or each piece of operating equipment:
   a. Provide brief description of product and major component parts of equipment.
   b. Provide indexed tabs.
   c. Type on colored paper.

6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
   a. Title of Project.
   b. Identity of separate structure as applicable.
   c. Identity of general subject matter covered in the manual.

7. Measurements: Provide U.S. standard units.

C. Binders:

1. Commercial quality three-ring binders with durable and cleanable plastic covers. Provide D-ring type binders.

2. Maximum ring size: 1-1/2 inch.

3. When multiple binders are used, correlate the data into related consistent groupings.

D. Covers: Provide front and end spine labels for each manual, using durable material, and clearly identified with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS

(Name and address of Work)

(Name of Contractor)

(General subject of this Manual)

(Space for approval date)

3.00 – EXECUTION

3.01 CONTENT OF MANUAL

A. Neatly typewritten table of contents for each volume, arranged in a systematic order.

1. Contractor, name of responsible principal, address and telephone number.

2. A list of each product required to be included, indexed to the content of the volume.

3. List, with each product, the name, address and telephone number of:
   a. Subcontractor and/or installer.
   b. Maintenance contractor, as appropriate.
   c. Identify the area of responsibility of each.
   d. Local source of supply for parts and replacement.

4. Identify each product by product name and other identifying symbols as set forth in the Contract Documents.

B. Product Data:

1. Include only those sheets which are pertinent to the specific product.

2. Annotate each sheet to:
   a. Clearly identify the specific product or part installed.
   b. Clearly identify the data applicable to the installation.
   c. Delete references to inapplicable information.

C. Drawings:

1. Supplement product data with drawings as necessary to clearly illustrate.
   a. Relations of component parts of equipment and systems.
   b. Control and flow diagrams.

2. Coordinate drawings with information in Section 01700-Project Close-out with regard to Project Record Drawings to assure correct illustration of completed installation.

3. Project Record Drawings shall not be used as maintenance drawings.

D. Instructions: Written text, as required to supplement product data for the particular installation:

1. Organize in a consistent format under separate headings for different procedures.

2. Complete instructions regarding operation and maintenance of all equipment involved including lubrication, disassembly, and reassembly.

3. Complete nomenclature for all parts of equipment.

4. Complete nomenclature and part number of replaceable parts, name and address of nearest vendor, and other data pertinent to procurement procedures.

E. Copy of each warranty, bond and service contract issued.

1. Provide information sheet for Owner's personnel, giving:
   a. Proper procedures in the event of failure or emergencies.
   b. Instances which might affect the validity of warranties or bonds.

3.02 MANUAL FOR MATERIALS AND FINISHES

A. Instructions for care and maintenance:

1. Manufacturer's recommendation for types of cleaning agents and methods.

2. Cautions against cleaning agents and methods which are detrimental to the product.

3. Recommended schedule for cleaning and maintenance.

3.03 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Content, for each unit of equipment and system, as appropriate:

1. Description of unit and component parts:
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data and tests.
   c. Complete nomenclature and commercial number of all replaceable parts.

2. Operating procedures:
   a. Start-up, break-in, routine and normal operating instructions.
   b. Regulation, control, stopping, shut-down and emergency instructions.
   c. Summer and winter operating instructions.
   d. Special operating instructions.

3. Maintenance Procedures:
   a. Routine operations.
   b. Guide to "trouble-shooting".
   c. Disassembly, repair and reassembly. Alignment, adjusting and checking.

4. Servicing and lubrication schedule: List of lubricants required.
5. Manufacturer's printed operating and maintenance instructions.

6. Description of sequence of operation by control manufacturer.

7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
   a. Predicted life of parts subject to wear.
   b. Items recommended to be stocked as spare parts.

8. As-installed control diagrams by manufacturer of controls.

9. Each contractor's coordination drawings: As-built color coded piping diagrams.

10. Charts of valve tag numbers, with the location and function of each valve.

11. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

12. Other data as required under pertinent sections of this Specification.

B. Content, for each electric and electronic system, as appropriate:

1. Description of system and component parts:
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data and tests.

c. Complete nomenclature and commercial number of replaceable parts.

2. Circuit directories of panelboards:
   a. Electrical service.
   b. Controls.
   c. Communications.

3. As-built color coded wiring diagrams.

4. Operating procedures:
   a. Routine and normal operating instructions.
   b. Sequences operating instructions. Special operating instructions.

5. Maintenance procedures:
   a. Routine operations.
   b. Guide to "trouble-shooting".
   c. Disassembly, repair and reassembly.
   d. Adjustment and checking.

6. Manufacturer's printed operating and maintenance instructions.

7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

C. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner personnel.

3.04 INSTRUCTION OF OWNER PERSONNEL

A. Prior to final inspection or acceptance, fully instruct Owner designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and systems, prior to occupancy.

1. Provide services of factory trained instructors from the manufacturer of each major item of equipment or system.

B. Operating and maintenance manual shall constitute the basis of instruction.

1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

2. Where warrants for further instruction or additional instruction is required to instruct the Owner designated personnel, the Contractor shall provide such additional instruction to include service of factory trained instructors. The cost for additional instruction will be reviewed for each individual basis by the Architect.

END OF SECTION

SECTION 01 74 00
WARRANTIES, GUARANTIES AND BONDS

1.00 – GENERAL

1.01 WORK INCLUDED

A. This Section specifies general requirements for written warranties, guaranties and bonds required by the Contract Documents.

B. Submittal to, and approval by, the Owner of the warranties, guaranties and bonds are prerequisites to final payment under the Contract.

1.02 RELATED WORK

A. Related work specified elsewhere: Section 01700 - contract Close-out

1.03 TIME PERIOD:

A. Deliver manufacturers' warranties, guaranties and bonds required by Contract Documents, with Owner named as beneficiary. For equipment and machinery, or components thereof, bearing a manufacturer's warranty or guaranty that extends for a longer time period than the Contrac-tor's warranty and guaranty, deliver manufacturer's warranties or guaranties in same manner.

1.04 FORM

A. Written warranties and guaranties, excepting manufacturer's standard printed warranties and guaranties shall be submitted on the Contractor's, Subcontractor's, material suppliers', or manufacturers' own letterhead, addressed to Owner. Warranties and guaranties shall be submitted in duplicate, and in the form shown on the following page, signed by all pertinent parties and by Contractor in every case, with modifications as approved by Owner to suit the conditions pertaining to the warranty or guaranty.

1.05 SUBMITTAL

A. The Contractor shall collect and assemble written warranties and guaranties from all subs, material suppliers and manufacturers into a bound booklet form, and deliver the bound books to Architect for delivery to the Owner's attorney for final review and approval.

B. Submit required warranty/guaranty on letterhead of Contractor responsible for each type of Work in accordance with attached sample form.

(See attached Warranty Form)

END OF SECTION

WARRANTY/GUARANTY

Date: _____

FOR_____WORK

We, the undersigned, do hereby warranty and guaranty that the parts of the Work described above which we have furnished and/or installed for:

PROJECT: BURNETT ELEMENTARY SCHOOL

is in accordance with the Contract Documents and that all said Work as installed will fulfill or exceed all the Warranty and Guaranty requirements. We agree to repair or replace Work installed by us, together with any adjacent Work which is displaced or damaged by so doing, that proves to be defective in workmanship, material, or operation within a period of _____( ) year(s) from the date of final acceptance by Owner or from the Date of Certificate of Substantial Completion, whichever is the earlier, ordinary wear and tear and unusual neglect or abuse excepted.

In the event of our failure to comply with the above mentioned conditions within a reasonable time period determined by the Owner, after notification in writing, we, the undersigned, all collectively and separately, hereby authorize the Owner to have said defective Work repaired and/or replaced and made good, and agree to pay to the Owner upon demand all moneys that the Owner may expend in making good said defective Work, including all collection cost and reasonable attorney fees.

_____
(Subcontractor, Sub-subcontractor, Manufacturer or Supplier)

By: _____

Title: _____

State License No: _____

Local Representative: For maintenance, repair, or replacement service, contact:

Name: _____

Address: _____

Phone Number: _____

SECTION 01 80 00
GENERAL SAFETY REQUIREMENTS

1.00 – GENERAL

1.01 GENERAL SAFETY PROVISIONS

A. The Contractor shall take safety and health measures in performing work under this Contract. It shall be the Contractor's sole responsibility to provide for safety of persons and property under this Contract. The Contractor shall meet with the Owner's Representative to develop a mutual understanding relative to administration of the safety plan. The Contractor is subject to applicable federal, state and local laws, regulations, ordinances, codes and orders relating to safety and health in effect on the date of the Contract. Attention is directed to the regulations issued by CAL-OSHA, The Secretary of Labor pursuant to the Contract Work Hours and Safety Standards Act and the Safety and Health Regulations for Construction. The Contractor shall comply with all regulations as applicable and shall comply with safety requirements stated.

B. During the performance of work under this Contract, the Contractor shall comply with procedures prescribed for control and safety of persons visiting the project site.

C. Contractor shall advise the Owner of any special safety requirements he has established for this project so that all appropriate Owner personnel can be notified of these restrictions.

1.02 SUBMITTALS

A. The Contractor shall prepare and submit a detailed Safety Plan (SD-08) at the Pre-Construction meeting. The Safety Plan will be reviewed by the Owner. The Contractor shall meet with the Owner Representative prior to beginning work to discuss in detail the various stages of the work and the Contractor's procedures for insuring the safety and health requirements for the project.

1.03 ACCIDENT REPORTING

A. The Contractor shall immediately report to the Owner any accident, incident or exposure resulting in fatality, injury or occupational disease or contamination of the property. The Contractor shall investigate all work related incidents or accidents to persons or property to the extent necessary to positively conclude what cause or causes resulted in said accident or incident, and furnish the Owner with a report in such form as the Owner may require of the investigative findings, together with proposed or completed corrective actions.

1.04 FIRST AID FACILITIES

A. The Contractor shall designate the location of the First Aid Dispensary and shall post emergency first aid and ambulance information at the project site.

1.05 OWNER REPRESENTATIVE VISITING WORK SITE

A. The Contractor agrees that authorized Owner representatives shall have access to, and the right to examine the site or areas where work is being performed.

1.06 FIRE PREVENTION AND PROTECTION

A. Open-flame heating devices will not be permitted except by written approval. Such permission will not be granted unless the Contractor has taken reasonable precautions to make such devices safe. Burning trash, brush or wood on the project site will not be permitted. Approval for the use of open fires and open-flame heating devices will in no way relieve the Contractor from the responsibility for any damage incurred because of fires. Flammable liquids shall be stored and handled in accordance with the Flammable and Combustible Liquids Code, NFPA 30.

B. Open fires will not be permitted in construction areas. Smoking shall not be permitted in areas such as paint storage, fuel storage, and posted no smoking areas.

1.07 USE OF EXPLOSIVES

A. Explosives shall not be used or brought to the project site without prior written approval. Such approval shall not be construed as relieving the Contractor of responsibility for any injury to persons or property due to blasting operations. Blasting shall be performed by skilled personnel in accordance with State laws and as approved. Minimum safety requirements for blasting shall be in accordance with ANSI A10.7.

1.08 BARRICADES AND TRAFFIC CONTROL

A. The work shall be conducted so as to minimize obstruction of traffic, and traffic shall be maintained on at least one half of the roadway with at all times. Approval shall be obtained prior to starting any activity that will obstruct traffic. Any reduction of any streets or any alleyways adjacent to the site, parking lots or parking areas shall require a written plan from the Contractor that must be approved by the Owner Representative prior to closure. The plan shall include the posting of Public Notice of the modifications or closure date.

END OF SECTION

SECTION 02 22 20
EXCAVATION AND BACKFILL FOR STRUCTURES

1.00 GENERAL

1.02 RELATED DOCUMENTS

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

1.03 WORK INCLUDED

A. Excavation, overexcavation, as necessary, and backfill for foundations, footings and general areas for structures.

B. Preparation, for concrete slabs of building areas.

C. Removal of debris, vegetation, roots and excess materials.

D. Trenching for utilities (Reference Specification).

E. Accept the site as it is at the time of bidding, and perform all work necessary to complete the job.

F. Check Drawings and/or "Concrete" specifications for base or membrane under slabs.

1.04 RELATED WORK:

A. Performing excavation and backfill of trenches for utilities.

B. Granular base for concrete paving.

C. Field Quality Control: Section 01400; record survey; vertical and horizontal control; soil testing.

D. Protection of existing utilities.

E. Sub-slab vapor barrier and protective fill.

1.05 GENERAL REQUIREMENTS:

A. Field conditions:

1. The building pads have been over-excavated, filled and compacted by others, in accordance with the Soils Report. Contractor shall obtain copies of the compaction reports and verify the conditions as listed below.

2. Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces. Report all conditions that prevent proper execution of this work.

B. Soil investigation report:

I. For character of soil, logs of borings and general recommendations refer to the "Geotechnical Investigation Report" Project #A10368.6, dated September 30, 2004, as prepares by Terra Search, Inc. and Supplemental Geotechnical Engineers Report File #SH-13216-SA, dated May 30, 2017 by Earth Systems.

2. Copies of report are on file and may be examined at the office of the Architect. Copies will be made available for use at the site during construction.

3. The report is made available for information only. There is no warranty, either expressed or implied, that conditions indicated by the report prevail over the entire site, or that other materials, proportions of materials, or conditions may not be encountered. The Contractor is cautioned to make such independent investigations as he deems necessary to satisfy himself as to all conditions, including sub-surface conditions, under which he will perform the work.

4. While the Soil Report is not a part of the Contract Documents, the recommendations contained therein shall be observed in the execution of the work as though repeated as requirements.

C. Filling, backfilling and compaction will be inspected by and shall be performed to meet the approval of the Soils Engineer.

1. Also conform to requirements of Chapter 33 and Appendix Chapter 33 of the Uniform Building Code.

D. Test and inspections: Contractor shall pay for all tests and inspections of complete installation. Costs of all tests and inspections at materials sources and costs of retests of rejected work shall be borne by the Contractor. Arranging for and scheduling of tests and inspections are responsibilities of the Contractor.

E. Layout of the work: The Contractor shall be responsible for the accuracy of all layout work and shall retain and pay for the services of a licensed Surveyor to set the lines and grades for all construction.

F. Bracing and shoring: When required, design, provide and maintain sheathing, bracing and shoring to safely support the sides of the excavations and to prevent movement which might injure or delay the work, change the required width of the excavation or endanger adjacent pavements, utilities, buildings, or other structures. Design walers and other bracing and install so as to present no obstructions to proper placement of the work. Withdraw and remove sheathing, bracing and shoring as the backfilling is done, in a manner so as to not endanger the completed work.

G. Remove all water, including rain water, encountered during the course of the trench and sub-structure work, to an approved point of disposal location by the use of pumps, drains, and other approved methods. Keep the excavations free from water until the backfilling is completed.

H. The Soils Engineer will advise the Contractor on control of moisture, limitation on use of various materials, and methods of compaction, all based on tests made during various stages of excavation and backfill. If these tests indicate specified density is not being obtained, the material shall be recompacted and retested. Costs of retesting shall be borne by the Contractor.

I. The Contractor shall protect existing utilities.

2.00 PRODUCTS

2.01 MATERIALS

A. Fill and Backfill materials: May be material from site, if the use of such is recommended in the Soil Report or shall be material from an offsite source approved by the Soils Engineer. Material shall be free of debris, vegetable matter and rocks and cobbles exceeding 6"

dimension. Material shall be non-expansive in nature unless the Soil Report provides for the use and/or treatment of expansive soils.

3.00 EXECUTION

3.01 SUBGRADE IMPROVEMENT FOR EXTERIOR SLABS:

A. After stripping the area of all vegetation and roots, the top 12" of sub-grade directly below aggregate base shall be scarified and compacted to 95% of maximum density.

3.02 TESTS:

A. All compaction tests shall conform to ASTM D1557 Method A or C unless otherwise specified in the Soil Report.

3.03 EXCAVATION FOR STRUCTURES:

A. Excavation to exact dimensions, levels and alignments required, removing all material encountered.

1. Where footings are formed, provide ample space for construction, inspection and the stripping of forms.

2. Footings may be cast against neat excavations provided banks will stand without caving or raveling, and excavations are trimmed accurately and smoothly, one inch wider each side than the dimensions on the drawings. If banks cave or slough, footings shall be formed and excavations made at least l foot wider each side to permit forming, bracing and inspection.

3. All subgrades for footings shall be approved by the Soils Engineer as to compliance with the drawings and specifications before form work, or other work, is done. The subgrade shall be free from all loose material at time concrete is deposited. Minimum depth of footings shall be 24". Verify with structural drawings.

B. Excavation limits: Exercise care to not excavate beyond the footing depths or limits shown on the drawings or authorized by the Soils Engineer. Where unauthorized excavation is made below indicated or authorized depth, backfill the overexcavated space with concrete having compressive strength of not less than 1500 psi at 28 days, at the Contractor's expense, or fill as otherwise directed by the Soils Engineer.

C. Disposition of excavated materials: Remove from the site all material which is not required or approved for backfill.

3.04 BACKFILLING AND COMPACTION:

A. Structure - General: Backfill excavations as construction operations permit, but not before work to be covered has been inspected and approved, trash and debris removed, and concrete reaches its 28 day strength. Except where walls and foundations have been adequately constructed to withstand eccentric loading, and except where backfill is equally and simultaneously placed on opposing sides of the structure, adequately brace such construction to withstand eccentric loading induced by backfill operations. Perform all backfilling under the supervision of the Soils Engineer. Do not deposit backfill until permission has been given by the Architect. Place backfill in horizontal layers 6" deep, uniformly moistening, tamping and compacting each layer.

B. Where backfill is placed against waterproofing, take special care to prevent damage to waterproofing membrane.

C. Compaction shall be as specified above for filling.

3.05 SUBGRADE PREPARATION:

A. Prepare earth grades to receive concrete flatwork by scarifying the sub-grade, where necessary. Slowly re-moisten the exposed subgrade as directed by the Soils Engineer and, if required, moisture-condition new material, compact and bring to the elevations required. During such operations, cut down or fill all high or low spots, remoistening and recompacting as required. Upon completion, the subgrades shall conform to required elevations and cross sections to receive the concrete flatwork or paving or granular base where specified or indicated.

B. Grade all planting areas to within 2" of finish grade, remove all rocks and debris.

3.06 TRENCHING FOR UTILITIES:

A. Excavate sufficiently wide for proper installation of lines. Where depth of trench is greater than five feet, the width of the trench bottom shall be not less than one foot wider nor more than two feet wider than the outside diameter of the pipe. Above the top of the pipe, the trench may be widened. The bottoms of the trenches shall parallel the slope of the pipe inverts with the trench subgrade being the outside of the pipe bottom. Excavate space for pipe bells below trench grade.

B. Trench bottoms shall be thoroughly compacted, free from loose stones or rock, true to line and grade. If trench bottom is of material which cannot be excavated to true subgrade, over-excavate 4". If bottom is of soft or spongy material, over-excavate 12". Refill over-excavated portions with graded gravel and tamp until firm, unyielding and true to the line and grade.

C. Provide all sheathing or bracing required to maintain trench walls and to protect workmen.

D. Keep water out of trenches while lines are being laid, until any concrete mortar or jointing material takes its final set and until backfill is above ground water table.

E. Do no backfilling until measurements for Record Drawings have been made.

F. Material around structures and for two feet above pipes shall be free of lumps and stones. Tamp carefully while placing backfill in 6" layers to avoid disturbing pipe. Use sufficient moisture to obtain optimum compaction. When backfill is in place one foot above the top of pipe, the remainder of the backfill may be compacted by mechanical means. Conform to any additional instructions required by mechanical or plumbing specifications.

G. Compaction by flooding or jetting is expressly prohibited.

3.07 PROTECTION OF FINISH SUBGRADES:

A. Continued use of prepared subgrades for hauling, which will cut or deform it from required cross section will not be permitted. Repair and recompact any damaged areas at Contractor's expense. Place no material until the subgrade is in a condition satisfactory to the Soils Engineer as meeting these specifications.

3.08 PROTECTION OF EXISTING WORK:

A. Protect existing paving, walks, buildings, and utilities from damage during installation of new work. Carefully examine the drawings and inspect the site to determine the proximity of such work.

3.09 DUST ABATEMENT

A. Conform to all codes and regulations and otherwise prevent dust from becoming an annoyance to personnel in the area and elsewhere.

3.10 CLEANUP

A. Remove from the site all debris resulting from the work, all material not suitable for fill, backfill or finish grading and all excess soil.

END OF SECTION

SECTION 02 31 00
EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

A. Principal work in this Section:

1. Trenching, backfilling and compacting for utilities.

2. Bedding material for pipes.

B. Related work:

1. Earthwork: Section 02 22 20 - Excavation and Backfill for Structures.

2. Installation and tests of utilities: Divisions 15 and 16.

1.03 QUALITY ASSURANCE

A. General: Obtain Geotechnical Engineer's approval of backfill materials, method of placement, and of the completed work of this Section.

B. Reference data: Maps, soil investigation reports, and similar reference data are made available to Contractor for information only. District and Architect assume no responsibility for conclusions the Contractor may draw therefrom.

C. Reference standard:

1. Perform all work in compliance with applicable provisions of "Standard Specifications for Public Works Construction" (SSPWC). Mention herein of section numbers refers to sections of the reference standard.

2. Where reference standard refers to "Agency," substitute the word "District." Where reference standard is in conflict with these Specifications, these Specifications govern.

1.04 WARRANTY

A. Any settling of backfill in trenches which may occur during the one year period after Substantial Completion shall be repaired to District's satisfaction by Contractor without expense to District, including complete restoration of damaged paving, walks, and other materials or installations of every kind.

2.00 PRODUCTS

2.01 IMPORTED MATERIAL

A. Imported fill:

1. Non-expansive granular material with an expansion index of less than 35.

2. Material shall not contain fines in excess of 40% passing No. 200 sieve, but it shall include sufficient fines (binder material) to produce a compacted fill which will not rut under construction traffic, and remain stable in shallow trenches.

3. Imported fill is subject to Geotechnical Engineer's approval before transporting to site.

2.02 ONSITE MATERIALS

A. Materials from cuts or excavations, approved by the Geotechnical Engineer, free of debris and without soft, spongy, organic and other deleterious materials.

1. Do not use cobbles or boulders larger than 4 in. in largest dimensions at any depth.

2. Do not use rocks greater than 2-1/2 in. in largest dimension in backfill within 12 in. of the top of pipe or structure, and within 12 in. of the top of pavement subgrade.

3. Where rocks are included in backfill, mix with suitable materials to eliminate voids.

2.03 BEDDING MATERIALS

A. Complying with section 306.1.2.1, Bedding, of the reference standard.

3.00 EXECUTION

3.01 INSPECTION

A. Verify conditions and measurements affecting the work of this Section at site. Make sure that detrimental conditions are corrected before proceeding with installation.

3.02 PROTECTIVE MEASURES

A. General: Comply with the following:

1. Utilities: Protect existing utility lines.

2. Settlement:

a. In areas where compacted backfill has been placed, additional consolidation will occur after completion due to changes in moisture content and surcharge.

b. Install utility connections crossing this backfill to the building, and improvements adjoining the building at the backfill line, to take into account this additional consolidation, or schedule sufficient time between backfilling operations and such improvements to allow this consolidation to take place.

3.03 COMPACTION CONTROL

A. Notification: Notify the Geotechnical Engineer whenever trench backfill work is being performed as part of this Section.

B. Replacement: Geotechnical Engineer will determine if work performed without inspection meets the requirements of these Specifications. Where directed by Geotechnical Engineer, uncover and replace work performed without inspection at no additional cost to the District.

3.04 TRENCH EXCAVATION

A. Before opening any new excavations, uncover all intersecting existing utility lines located between the ground surface and one foot below the bottom of the new trench line.

1. General:

a. Where unidentified existing utilities are encountered, determine whether these are active or abandoned.

b. Remove interfering portions of abandoned utilities and cap or plug open ends of pipe to remain.

c. The cap or plug must seal the opening in such a manner that would permit remaining portion of the utility to be reactivated.

d. Notify Architect for instructions on utilities which are determined to be active. Any relocation work performed on an active utility without obtaining prior approval of Architect will be done at the Contractor's risk and expense.

e. Do not proceed without instructions, except to correct an immediate hazard or emergency condition.

2. Trench width:

a. Maximum width of trench shall be 20 in. more than greatest diameter of pipe up to a point 6 in. above top of the pipe, except that it may be widened enough to place sheeting.

b. Make trenches at least 12 in. wider than greatest exterior diameter of pipe or conduit except that trenches for concrete encased ducts may be the same width as duct encasement.

3. Dimensional tolerance:

a. Maintain accuracy of gravity utility lines designated for gradients less than 1% to 1/8 in. at any point and cumulative within ½ in./100 ft.

b. For all gravity lines, check each section of pipe for proper gravity slope direction with a string line set over the pipe by a surveyor.

c. Non-gravity utility line subgrades shall be accurate within +2 in.

3.05 PIPE BEDDING

A. Where bedding is required, provide a minimum of 4 in. of bedding material in the bottom of the trench, in addition to the requirements of section 3061.2.1 of the reference standard, before installing pipes or conduits.

B. Prior to jetting the bedding material, where jetting is permitted by the Geotechnical Engineer, make provisions at the downstream end of the trench to remove the excess water.

C. Do not allow water to accumulate in the trench.

3.06 DEWATERING

A. At no time shall water be allowed to back up into pipe in place. Securely plug terminal ends of pipe before work is abandoned at end of day or when laying is interrupted.

3.07 TRENCH BACKFILL

A. Backfilling of utility trenches shall not be undertaken (1) for 24 hours after Geotechnical Engineer has been notified of same, (2) until required tests and inspections have been completed, and (3) until "as-built" location notes have been recorded.

B. Place backfill material in compliance with section 3061.3.2 of the reference standard, and to achieve at least 90% of the maximum density in compliance with ASTM D 1557. The top 12 in. of backfill in the building and under paved areas shall be compacted to 95% of maximum density.

C. Unless otherwise authorized by the Geotechnical Engineer, compaction by ponding or flooding will not be permitted.

D. Remove surplus earth left after backfilling, and grade top of trench to match adjacent grades.

E. Backfill voids left by removal of sheeting, piles, and similar sheeting supports immediately with clean sand to assure dense and complete filling of voids.

END OF SECTION

SECTION 02 31 90
BASE COURSE

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Installation of base material.

B. Related Sections:

1. Section 02 31 00: Excavating, Backfilling and Compacting for Utilities.

2. Section 02 71 00: Asphaltic Concrete Paving.

3. Section 02 72 00: Portland Cement Concrete Paving.

1.03 SUBMITTALS

A. Product Data: Submit technical information and test data for base materials.

B. Sample: Submit Sample of proposed base course material.

1.03 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement: Standard Specifications for Public Works Construction, current edition.

2.00 PRODUCTS

2.01 UNTREATED BASE MATERIALS

A. The following base materials are classified, in order of preference, in conformance with the requirements of Standard Specifications for Public Works Construction: Section 200 – Rock Materials.

1. Crushed aggregate base or crushed slag base.

2. Crushed miscellaneous base.

3. Processed miscellaneous base.

4. Select sub-base.

5. Disintegrated Granite Base: Conforming to requirements of the Standard Specifications for Public Works Construction: Section 400 – Alternate Rock Products, Asphalt Concrete, Portland Cement Concrete and Untreated Base Material.

2.02 MATERIAL APPROVAL

A. Base material shall be reviewed by the Owner's Consultant before installation.

3.00 EXECUTION

3.01 INSTALLATION

A. Install 6" thick base course material in layers not exceeding 4 inches in thickness, unless required otherwise. Grade and compact to indicated levels or grades, cut and fill, water and roll until the surface is hard and true to line, grade and required section. Provide a relative compaction of at least 95 percent, unless otherwise required.

B. Grade base course to elevations indicated on Drawings, ready to receive surfacing, in accordance with Section 02 22 20 – Excavation and Backfill for Structures.

3.02 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.03 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 02 36 00
TERMITE CONTROL

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SCOPE

A. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified, and as necessary to complete the Contract, including, but not limited to, these major items:

1. Soil treatment for termite control.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Preparation of soil grades beneath floor and patio concrete slabs.

1.04 GENERAL REQUIREMENTS

A. Codes: Materials and work shall conform to the governing building code. In case of conflict between these specifications and the Building Code, the more stringent shall govern.

2.00 PRODUCTS

2.01 MATERIALS

A. Chemicals for soil treatment shall be one of the following:

Chemicals	Concentrations
Aldrin	0.5% applied in water emulsion
Benzene Hexachloride (BHG)	0.8% of gamma isomer applied in water emulsion
Chlordane	1.0% applied in water emulsion
Heptachlor	0.5% applied in water emulsion
Dieldrin	0.5% applied in water emulsion

3.00 EXECUTION

3.01 APPLICATION

A. Application of chemical soil treatment shall be in strict accordance with the manufacturer's recommendations.

B. Apply an overall treatment under the entire surface of the floor slab excluding exterior walks and including patio slabs and entrance platforms and around all slab penetrations except water supply. Apply at a rate of 1 1/2 gallons per 10 square feet.

C. Apply one gallon per 10 linear feet in a strip one foot wide along outside of the foundations.

D. Treatment shall not be made when the fill is excessively wet or immediately after heavy rains. Unless the treated areas are to be immediately covered, precautions shall be taken to prevent disturbance of the treatment by human or animal contact within the treated soil.

3.02 QUALITY CONTROL

A. All materials used shall bear the manufacturer's warning to be observed in handling and use of the material.

B. Submit FHA Form 2052, Termite Soil Treatment Guarantee to Project Manager.

END OF SECTION

SECTION 02 71 00
ASPHALT CONCRETE PAVING

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

B. Asphaltic concrete paving.

C. Surface sealer.

D. Aggregate base course.

1.03 RELATED SECTIONS

A. Section 02 22 20 – Excavation and Backfill for Structures

B. Section 02 31 90 – Base Course.

C. Section 02 72 00 – Portland Cement Concrete Paving.

1.04 REFERENCES

A. References herein to State Standard Specifications are to the Standard Specifications of the Department of Transportation, State of California (Caltrans), Latest Edition.

B. References herein to Standard Specifications are to the Standard Specifications for Public Works Construction, prepared by the Southern California Chapters of the American Public Works Association and The Associated General Contractors of America, latest Edition.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with Caltrans Standard Specifications for Public Work.

B. Obtain materials from same source throughout.

C. Qualifications of Asphalt Concrete Producer: Bulk asphaltic concrete producer regularly engaged in production of hot-mix, hot-laid asphalt concrete.

D. Tests: Materials for which physical characteristics have been stipulated shall have had such characteristics independently confirmed by laboratory tests employing industry-recognized procedures. Both the laboratory performing the tests and the test methods employed will be subject to the approval of the Architect.

E. Certification: Furnish certification, in written form, from the asphaltic concrete producer, confirming the conformance of the following with the requirements of this specification:

1. Materials proposed for incorporation into the Work.

2. Asphaltic concrete mix design formulae.

1.06 REGULATORY REQUIREMENTS

A. In addition to complying with applicable codes and regulations of governmental agencies have jurisdiction, comply with applicable requirements of CALTRANS Standard Specification for Public Works Construction.

B. Where the provisions of applicable codes, regulations and standards conflict with the requirements of these specifications, comply with the more stringent provisions.

1.07 PROJECT CONDITIONS

A. Apply bituminous prime and tack coats only when the ambient temperature in the shade is above 50 degrees F.

B. Do not apply when the base surface is wet or contains an excess of moisture which would prevent uniform distribution and the required penetration.

C. Construct asphalt concrete surface course only when atmospheric temperature is above 40 degrees F, when the underlying base is dry, and when weather is not rainy.

D. Grade Control: Establish and maintain the required lines and grades, including crown and cross-slope, for each course during construction operations.

E. Traffic Control: Maintain vehicular and pedestrian traffic during paving operations, as required for other construction activities.

1.08 GUARANTEE

A. Submit one-year guarantee in accordance with and in form required in Division 1. Guarantee shall include bringing to grade and repairing of defective surfacing due to grade settlement of fills, trench fills or any portion of base or surfacing.

1.09 SUBMITTALS

A. Comply with pertinent section of Section 01300.

B. Product Data: Within 35 calendar days after the Contractor has received the District's notice to proceed, submit:

1. Materials list of items proposed to be provided under this Section.

2. Certificates, signed by the materials producer and the asphaltic paving subcontractor, stating that materials meet or exceed the specified requirements.

2.00 PRODUCTS

2.01 MATERIALS

A. Aggregate Base:

1. Graduation: Comply with local highway standards.

B. Aggregate for Asphalt Concrete, General:

1. Sound, angular crushed stone, crushed gravel, or crushing slag: ASTM D 692.

2. Sand, stone, or slag screening: ASTM D 1073.

3. Provide aggregate in graduations for various courses to comply with local highway standards.

C. Base Course Aggregates:

1. Uncrushed gravel may be used in mixture if it meets design criteria specified.

2. Provide uniform quality combined aggregates with a minimum sand equivalent value:

a. 35 for light and medium traffic areas.

D. Surface Course Aggregates:

1. Provide natural sand, unless sand prepared from stone, slag or gravel or combinations are required to suit local conditions.

2. Provide uniform quality combined aggregate with a minimum and equivalent value:

a. 40 for light and medium traffic areas.

E. Asphalt Cement: Comply with ASTM D 946 and the asphalt cement shall be AR 4000 grade.

F. Prime Coat:

1. Cut-back liquid asphalt.

2. Medium-Curing Type: ASTM D 2027, Grade AR-4000 as defined in the Caltrans Specifications.

G. Tack Coat: SS1h Emulsified asphalt.

2.02 ASPHALT - AGGREGATE MIXTURES

A. Job-mix Criteria:

1. Provide job-mix formulas for each required asphalt-aggregated mixture.

2. Establish a single percentage of aggregate passing each required sieve size, a single percentage of asphalt cement to be added to aggregate, and a single temperature at which asphalt concrete is to be produced.

3. Comply with the mix requirements of Caltrans Specifications Section 39.

4. Maintain material quantities within allowable tolerances of the governing standards.

2.03 HEADERS AND STAKES:

A. Construction Heart Grade Redwood; minimum 2x6. Use (3) 16d galvanized nails for fastenings, each stake.

2.04 WEED KILLERS

A. Provide a dry, free flowing, dust free chemical compound containing not less than 30% sodium chlorate or a chlorate-borate compound. Product shall be non-flammable, not

creating a fire hazard when applied in accordance with the manufacturer's recommendations, soluble in water, and capable of being spread dry or in solution.

B. Acceptable Products:

1. "Spike 80W" by Dow Elanco.

2. Equal products of other manufacturers when accepted in advance by the Architect.

2.05 SEAL COAT (After 30 Days)

A. Over-Kote asphalt pavement coating as manufactured by Diversified Asphalt Products or approved equal.

3.00 EXECUTION

3.01 PREPARATION

A. Aggregate Base Course:

1. Check sub-grade for conformity with elevations and section immediately before placing aggregate base material.

2. Place aggregate base material in compacted layers not more than four inches thick. Compaction shall be obtained by use of an approved power roller weighing not less than ten tons.

3. Spread, shape, and compact all aggregate base material deposited on the subgrade during the same day.

4. Compact aggregate base course material to not less than 95 percent of maximum density: ASTM D 1557, Method D.

5. Test density of compacted aggregate base course: ASTM D 2167.

6. Conduct one test for each 2,500 square yards of in-place material, but in no case no less than one daily for each layer.

7. Treat all sub-base with weed killer in accordance with manufacturer’s instructions. Take extreme precaution to confine weed poison to area covered with Asphaltic concrete, and provide all necessary protection to prevent injury or damage to life or property.

8. Headers: Secure with stakes at 4 ft. centers driven flush with top of header and nailed to header boards. Stake depth minimum 24 inches into soil and headers shall be minimum 2x6 inches. Doubled redwood bender board may be used at curved/radius areas but it must meet the approval of the Architect.

B. Prime Coat:

1. Uniformly apply at rate of 0.20 to 0.25 gallons per square yard over compacted and cleaned sub-base surface.

2. Apply enough material to penetrate and seal, but not flood the surface.

3. Allow to cure and dry as long as required to attain penetration and evaporation of volatile, and in not case less than 24 hours unless otherwise acceptable to the Architect.

4. Blot excess asphalt with just enough sand to prevent pick-up under traffic. Remove loose sand before paving.

C. Tack Coat:

1. Dilute material with equal parts of water and apply to contact surfaces of previously constructed asphalt concrete or Portland cement concrete and similar surfaces.

2. Apply at rate of 0.05 to 0.15 gallons per square yard of surface.

3. Apply tack coat by brush to contact surfaces of curbs, gutters, manholes, and other structures projecting into or abutting asphalt concrete pavement.

4. Allow surfaces to dry until material is at condition of tackiness to receive pavement.

3.02 PREPARING THE MIXTURE

A. Comply with ASTM D 995 for material storage, control, and mixing, and for plant equipment operation.

B. Heating:

1. Heat the asphalt cement at the mixing plant to viscosity at which it can be uniformly distributed throughout mixture.

2. Use lowest possible temperature to suit temperature-viscosity characteristics of asphalt.

3. Do not exceed 350 degrees F.

C. Aggregate:

1. Deliver dry aggregate to mixer at recommended temperature to suit penetration grade and viscosity characteristics of asphalt cement, ambient temperature, and workability of mixture.

2. Accurately weigh or measure dry aggregates and weigh or meter asphalt cement to comply with job-mix formula requirements.

D. Joints:

1. Carefully make joints between old and new pavements, or between successive days' work, to ensure a continuous bond between adjoining work.

2. Clean contact surfaces free of sand, dirt, or other objectionable material and apply tack coat.

3.03 COMPACTING THE MIX

A. Provide sufficient power rollers to obtain the required pavement density. Minimum 10 ton power roller.

B. Begin rolling operations as soon after placing when the mixture will bear weight of roller without excessive displacement.

C. Do not permit heavy equipment, including rollers to stand on finished surface before it has thoroughly cooled or set.

D. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

E. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of transverse and longitudinal joints and outside edge.

F. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot and in condition for compaction. Continue second rolling until mixture has been thoroughly compacted.

G. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained specified density.

H. Patching:

1. Remove and replace defective areas.

2. Cut-out and fill with fresh, hot asphalt concrete.

3. Compact by rolling to specified surface density and smoothness.

4. Remove deficient areas for full depth of course.

5. Cut sides perpendicular and parallel to direction of traffic with edges vertical.

6. Apply tack coat to exposed surfaces before placing new asphalt concrete mixture.

3.04 FIELD QUALITY CONTROL

A. General: In addition to other specified conditions, comply with following minimum requirements:

1. Test in-place asphalt concrete courses for compliance with requirements for density, thickness and surface smoothness.

2. Provide final surfaces of uniform texture, conforming to required grades and cross-sections.

B. Thickness: In-place compacted thicknesses shall conform to the dimensions shown on the Drawings. Variation from indicated thicknesses shall not exceed plus or minus ½ inch.

C. Surface Smoothness:

1. Test finished surface of each asphalt concrete course for smoothness, using a 10 ft. straightedge applied parallel to and at right angles to centerline of paved areas.

2. Surfaces will not be acceptable if exceeding the following:

a. Base Course: 1/4 inch in 10 feet.

b. Surface Course: 3/16 inch in 10 feet.

3.05 FLOOD TEST

A. Flood Test: Before applying a seal coat or striping, a water test shall be made in the presence of the DSA inspector. The flooding shall be done by water tank truck. All depressions, where water ponds to a depth of more than 1/8 inch shall be filled or the slope shall be corrected to provide proper drainage. The edges of the fill shall be feathered and

smoothed so that the joint between the fill and the original surface is invisible. All corrected work of the asphalt concrete paving shall be of the same mix design.

B. Place the entire contents of each drum sealer in a plaster or pug mill type mixer thoroughly. Where less than 50 gallons of sealer are used, mixing may be done in a mortar box. During mixing, the sealer may be diluted with water to produce a uniform, free flowing consistency, but in no case shall it be diluted with more than 10 percent.

C. Areas to receive seal coat shall be swept clean and before application, lightly sprayed with water, leaving it cool and damp, but without free water.

D. Apply seal coat by pouring from a can or a wheeled container in a continuous parallel lines and spreading immediately with rubber-faced squeegees or with long-handled hair brooms. The squeegee or broom shall be pulled at an angle from the line of spread to continually roll the material toward the operator and not to overflow or spill over its forward edge away from the operator.

E. Make two or more applications using at least 35 gallons of sealer (before dilution) per 1,000 square feet of area.

F. The finished surface seal, when dry and thoroughly set, shall be smooth, tough, waterproof, resilient, of uniform black color and free from coarse textured areas, lap marks, ridges and other surface irregularities. Should any defects appear in the finished surface, apply as many additional coats of sealer as may be required to produce the specified finished surface at no additional cost. Protect from traffic during all operations and until the sealer is thoroughly set and cured and does not pick-up under foot or wheeled traffic.

3.07 ADJUSTING AND CLEANING

A. Cleaning: After completion of paving operations, clean surfaces of excess or spilled asphalt materials or marking paint to the satisfaction of the Architect.

3.08 PROTECTION

A. After final rolling, do not permit vehicular traffic on asphalt concrete pavement until it has cooled and hardened, and in no case sooner than six hours.

B. Provide barricades and warning devices as required to protect pavement and the general public.

C. Protect adjacent surfaces from sealer installation.

END OF SECTION

SECTION 02 72 00
PORTLAND CEMENT CONCRETE PAVING

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

B. Concrete drives sidewalks, stair steps, integral curbs, gutters, curb cuts and mow strips.

B. Colored Concrete Paving.

1.03 RELATED SECTIONS

A. Section 02 22 20 – Earthwork and Backfill for Structures.

B. Section 02 31 00 – Excavating, Backfilling, and Compacting for Utilities.

C. Section 03 30 00 – Concrete work: General requirements for concrete work.

D. Section 07 90 00 – Joint Sealers.

1.04 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings.

B. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

C. ASTM A185 – Welded Steel Wire Fabric for Concrete Reinforcement.

D. ASTM A497 – Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

E. ASTM A615 – Deformed and Plain Billet-Steel for Concrete Reinforcement.
F. ASTM C33 – Concrete Aggregates.

G. ASTM C94 - Ready Mix Concrete.

H. ASTM C150 – Portland Cement.

I. ASTM C260 – Air-Entraining Admixtures for Concrete.

J. ASTM C309 – Liquid Membrane-Forming Compounds for Curing Concrete.

K. ASTM C494 – Chemical Admixtures for Concrete.

L. ASTM D1751 – Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.05 SUBMITTALS FOR REVIEW

A. Section 01300 – Submittals: Procedures for submittals.

B. Aggregate: Submit samples of local aggregates.

C. Samples: Submit two each sample panels, 48 x 48 inch in size illustrating exposed aggregate finish and each color.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with requirements of Section 03 30 00.

B. Obtain cementitious materials from same source throughout.

1.07 REGULATORY REQUIREMENTS

A. In addition to complying with applicable codes and regulations of governmental agencies having jurisdiction, comply with the applicable requirements of Caltrans Standard Specifications for Public Work Construction, and of the CRSI Manual of Standard Practices.

B. Where the provisions of applicable codes, regulations and standards conflict with the requirements of this specification, comply with the more stringent provisions.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not place concrete when base surface temperature is less than 50 degrees F, or surface is wet or frozen.

2.00 PRODUCTS

2.01 FORM MATERIALS

A. Form Materials: As specified in Section 03 30 00.

2.02 REINFORCEMENT

A. Reinforcing Steel: Type specified in Section 03 30 00.

2.03 CONCRETE MATERIALS

A. Concrete Materials: As specified in Section 03 30 00.

B. Fine and Coarse Mix Aggregates: ASTM C33.

C. Exposed Aggregate: Gravel washed natural mineral aggregate, peagravel from a single source and color approved by Architect.

D. Water: Potable, not detrimental to concrete.

2.04 COLORED AND TEXTURED FINISHES WHERE DETAILED

A. Products of Davis Concrete Colors (800) 356-4848 or L. M. Scofield Company. NOTE: Products of this Company must conform to the requirements.

B. Retarder: HCA-2.

1. Color #1: Green Slate 3685.

2. Color #2: Spanish Gold 5084.

3. Color #3: Natural Gray.

C. Color location per Architect.

2.05 ACCESSORIES

A. Joint Filler: Premolded asphalt saturated strips 3/8 inch thick. Shape to conform to full depth slabs, curbs, and driveways as required.

B. Liquid Curing Compound: Non-staining, complying with ASTM C309 at manufacturer's recommend rate of application. Deliver curing compound in unopened labeled containers. Waxfree, fugitive resin type. Thompson's Waterseal, Hunt's TLF, or equal.

C. Sealer: "Cementone" as manufactured by L.M. Scolfield Company, or approved equal.

D. Retarder: "Lithotex" manufactured by L.M. Scolfield Company, or approved equal.

E. Rock Salt: Commercial standard, packaged salt crystals, No. 2 size, free of fines where noted.

2.06 CONCRETE MIX – BY PERFORMANCE CRITERIA

A. Refer to Section 03300.

B. Concrete paving shall have a minimum ultimate compressive strength of 2,500 PSI at 28 days.

2.07 SOURCE QUALITY CONTROL AND TESTS

A. Refer to Section 03 30 00.

2.08 WEED KILLERS

A. Provide a dry, free flowing, dust free chemical compound containing not less than 30% sodium chlorate or a chlorateborate compound. Product shall be non-flammable, not creating a fire hazard when applied in accordance with the manufacturer's recommendations, soluble in water, and capable of being spread dry or in solution.

B. Acceptable Products:

1. "Spike 80W" by Dow Elanco.

2. Equal products of other manufacturers when accepted in advance by the Architect.

2.09 DETACTABLE WARNING SURFACES

A. Special warnings for disabled persons shall comply with CBC Sections 1133B.8.5. Shall be provided at curb cuts as detailed.

3.00 EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do no proceed until unsatisfactory conditions are corrected.

B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

A. Subgrade shall be smooth, true to line and grade and tested for required compaction prior to start of placing concrete. Dampen subgrade 24 hours before placing. Reroll as required to smooth, hard, even surface of 90 percent compaction. Wet forms to tighten cracks.

3.03 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Notify Architect minimum 48 hours prior to commencement of concreting operations.

3.04 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

A. Clean reinforcement to remove loose rust and mill scale, earth, and other materials which reduce or destroy bond with concrete.

B. Place reinforcement as indicated or to obtain the required coverage for concrete protection.

C. Position, support, and secure reinforcement against displacement by formwork, construction, and concrete placement operations.

D. For all concrete paving / walkways, ramps, stairs, etc. the minimum reinforcing shall have reinforcing per Section 03 30 00 and as shown on Drawings. Provide (1) #5 continuous nosing bar at all edges of concrete walkways in a scooped footing minimum 8” X 8”.

E. Break reinforcement at expansion joints only.

3.06 CONCRETE

A. Transit mix the concrete in accordance with provisions of ASTM C94.

1. With each load, provide ticket certifying the materials and quantities as well as compliance with the approved mix design.

2. On the transit mix ticket, state the time water was first added to the mix.

3. At the batch paint, withhold 1-1/2 gallons of water per cubic yard of concrete.

4. Upon arrival at the job site, and as directed by the Testing Laboratory Inspector, add all or part of the withheld water before the concrete is discharged from the mixer.

5. Mix not less than five minutes after the withheld water has been added, and not less than one minute of that time immediately prior to discharge of the batch.

6. Unless otherwise directed, provide 15 minutes total mixing time per batch after first addition of water.

7. Do not use concrete that has stood over 30 minutes after leaving the mixer, or concrete that is not placed within 60 minutes after water is introduced into the mix.

8. Minimum thickness if the concrete slabs or walks shall be four inches thick unless noted otherwise on the drawings.

9. Cement shall be from a single source.

B. Conveying:

1. Place concrete in accordance with the following and pertinent recommendations contained in ACI 304.

2. Deposit concrete continuously in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within the section.

3. If a section cannot be placed continuously, provide construction joints as specified herein.

4. Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic.

5. Deposit concrete as nearly as practicable in its final location so as to avoid segregation due to rehandling and flowing.

6. Do not subject concrete to any procedure, which will cause segregation.

7. Do not use concrete, which becomes non-plastic and unworkable, or does not meet required quality control limits, or has been contaminated by foreign materials.

8. Remove rejected concrete from the site.

C. Deposit and consolidate concrete in a continuous operation within the limits of construction joints until the placing of a panel or section is completed.

1. Bring surfaces to the correct level with a straightedge, and then strike off.

2. Use bullfloates or darbies on the plastic surface, leaving it free from bumps and hollows.

3. Do not sprinkle water in the plastic surface. Do not disturb the surfaces prior to start of finishing operations.

3.07 JOINTS

A. Expansion and Keyed Joists: Extend entirely through curbs and slabs: Unless otherwise indicated locate at 20 feet on-centers for flatwork and 10 feet on-centers for curbs. Expansion joints may be deleted by District. Verify locations prior to pour.

1. Break reinforcing steel at joints only.

2. Use at all cold joints.

3. Install, ONLY AT SPECIFIED LOCATIONS, continuous expansion joint filler full depth at all construction joints and at all vertical surfaces or ½" wide x 2" deep tooled joint with tooled edges. Must obtain Architect's approval prior to using tooled joint method.

4. "Quick" joints may be allowed to control shrinkage at small areas of flatwork only or the approval of the Architect.

5. Tool edges minimum 1/4 inch radius edges.

6. All expansion joints shall be caulked. See specification Section 07900.

B. Control Joints: As shown on drawings, but generally at 10 feet on-centers both ways. Locate between expansion joints where possible. Do not use as substitute for expansion joints.

1. Sawcut one-third depth of slab minimum immediately after slab has attained its initial set or within a 24 hour period.

2. Plastic "quick" joints with removable cap may be used in lieu of sawcutting. Embed to one-third depth of slab, or may use two inch tooled joint into the depth of the slab.

3. Location: As shown on drawings.

C. Tooled Joints:

1. General: Joints shall be true to line and profile. Tooling shall be done while concrete is plastic.

2. Jointing Tool: Shall be two inches wide at surface, tapered, with top edges rounded to 1/4 inch radius and minimum one inch penetration.

3. Location: As shown on Drawings, but in any case not more than five feet on centers both ways.

3.08 FLOATING & FINISHING

A. Floating:

1. Begin floating when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation.

2. During or after the first floating, check the planeness of surface with a ten-foot straight edge applied at not less than two different angles.

3. Cut down high spots and fill low spots, and produce a surface level within ¼ inch in 10 feet as determined by a 10 foot straightedge placed anywhere on the surface in any direction.

4. Refloat the surface immediately to a uniform sandy texture.

5. Where indicated, apply color hardener evenly to the plastic surface by the dry shake method, using a minimum of 60 pounds per 100 square feet. Apply in two shakes. Wood float after each and trowel only after final floating.

B. Finishing:

1. Flatwork without stamped pattern: Portland cement concrete paving shall have a Salt or Medium broom finish on all surfaces with less than 6% slope and slip resistant heavy broom finish on all surfaces with greater than 6% slope. BROOM DIRECTION MAY VARY ON SEPARATE PANELS. VERIFY WITH ARCHITECT. Color as per Paragraph 2.04; location by Architect.

2. Flatwork:

a. Curbs and Gutters: Prior to the removal of curb forms, the surface shall be finished true to grade by means of a straight edge float, not less than 10 feet, in length, operated longitudinally over the surface of the concrete. Smooth trowel face of curb immediately after removal of form. Steel trowel face and tops of curb and provide rounded front and back edges. After the face of the curb has been troweled smooth, it shall be given a final brush finish with brush strokes parallel to the line of the curb. Top and face of curbs shall be true and straight, of uniform width, free from humps, sags or other irregularities. Establish a 3” unformed width flow line at the curbs base with a smooth troweled finish, free of humps, sags or other irregularities.

b. Tooling: Tool surfaces as indicated in drawings with scoring tool to leave rounded edge.

3.09 CURING

A. Moist Curing for Natural Concrete: Cover with reinforced waterproof curing paper or polyurethane vapor barrier. Seal all joints and weight down edges. Maintain moist for seven days.

B. Sealing, for Natural Concrete: Locations as approved by the Architect. Apply a uniform coating within two hours of final troweling.

C. Curing and Cleaning for Stamped Colored Concrete: Apply Colorwax, in the matching color, uniformly at coverage rate recommended by its manufacturer. Do not apply Colorwax in joints to be grouted.

3.10 ADJUSTING AND CLEANING:

A. Construction Joints: Clean by sandblasting if necessary to remove excess concrete.

B. Patching: Patch cracks, rock pockets, and honeycombs as directed by Architect. Apply a uniform coating within two hours of final troweling.

3.11 TOLERANCES

A. Maximum Variation of Surface Flatness: ¼ inch in 10 ft.

B. Maximum Variation from True Position: ¼ inch.

3.12 FIELD QUALITY CONTROL

A. Refer to Section 03 30 00.

3.13 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian or vehicular traffic over pavement for 7 days minimum after finishing.

END OF SECTION

SECTION 02 76 00
PAVEMENT MARKINGS AND PRECAST CONCRETE BUMPERS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Provide pavement marking, crosswalk markings, directional pavement markings as indicated.

B. Related Sections:

1. Section 02 71 00 – Asphaltic Concrete Paving.

2. Section 02 72 00 – Portland Cement Concrete Paving.

3. Section 07 90 00 – Joint Sealers.

1.03 REFERENCES

A. ADA - Title III of the American with Disabilities Act, for the Disabled.

B. CAR - The California Accessibility Regulations, Part 2, Title 24 of the California Code of Regulations, 1998 California Building Code with State Amendments.

1.04 SUBMITTALS

A. Make submittals in accordance with Section 01300 - Submittals.

1. Submit a complete list of all materials to be furnished stating supplier and distributor's names.

2 Submit manufacturer's standard color samples for each type of paint specified. Once colors have been selected, submit 3 samples of each color selected for each type of paint, on standard 8-1/2" x 11" spray-out panel.

B. Shop Drawings: Scaled drawings of layouts for striping for approval prior to their application.

C. Data: Manufacturer’s detailed technical materials and application data, including technical bulletins, guides and manuals for striping and game lines paint.

1.05 REGULATORY REQUIREMENTS

A. Conform to the more restrictive provisions of Title III of the American with Disabilities Act or the CCR, Title 24, Part 2, California Accessibility Regulations, 1998 California Building Code with State Amendments.

B. Pavement markings shall conform to AQMD 1113 and current VOC limits.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 – Product Handling: Environmental conditions affecting products on site.

B. Do not apply pavement markings to surfaces below 40 degrees F or above 95 degrees F unless recommended by the manufacturer.

C. Do not apply pavement markings when rain is predicted within 48 hours or less than 5 days after surface has been wet.

D. Do not apply pavement markings in high or gusty winds.

2.00 PRODUCTS

2.01 MATERIALS

A. Manufacturers:

1. Dunn-Edwards Corp., Product "Vin-L-Strip Acrylic-Epoxy Traffic Paint".

2. Frazee Paint and Wallcovering, Product “Traffic Line Paint-Acrylic”.

B. Paint: Water emulsion based.

3.00 EXECUTION

3.01 PAVEMENT MARKINGS

A. Application of Paint:

1. Prior to application of paint, clean and prepare existing pavement in accordance with paint manufacturer's printed instructions.

2. Using mechanical equipment, apply the paint evenly, straight or curved as indicated, without holidays and other defects.

3. Do not permit any traffic until paint has completely dried.

3.02 SCHEDULE

A. Marking Width and Color: Unless indicated otherwise, marking width and color are as follows:

			Width	Color
1.	Traffic markings		4"	Yellow
2.	Striping:			
	a.	General	4"	Yellow
	b.	Accessibility	4"	Blue #15090 per federal standard 595B
3.	Accessibility emblem: background		2"	White on blue
	a.	Marked according to CBC Section 1129B.3 and 1129B.4.		
	b.	Letters and Numbers -	2"	White
	c.	Where 2 different sets of lines overlap, one shall be white and the other yellow.		

4. Except as specified or otherwise indicated, use white paint.

B. Apply marking paint in accord with SSPWC Section 310-5.6 and CALTRANS Section 84-3.

3.03 PRECAST CONCRETE BUMPERS

A. Drive anchoring pins full depth and recess ½ in. below top surface of precast concrete bumper. Fill with caulking flush to top of bumper.

B. Precast concrete bumpers: 3,000 psi precast concrete with chamfered edges and openings for anchoring pins. Provide with smooth finish, free from pits and rock pockets.

1. Cement: ASTM C 150, Type I or II.

2. Aggregates: ASTM C 33.

3. Reinforcing steel: ASTM A 615, Grade 40. Two No. 3 bars minimum, full length for bumper, spaced one each side of anchoring pin openings.

4. Anchoring pins: Hot-dip galvanized standard weight steel pipe, solid rod, or reinforcing bar, 3/4 in. diameter, 24 in. long.

5. Sealant: As specified in Section 07 90 00.

3.04 PROTECTION

A. Do not permit pedestrian or vehicular traffic over pavement for two (2) days minimum after finishing.

END OF SECTION

SECTION 02 76 10
SURFACE MOUNTED DETECTABLE WARNING SURFACES

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes: This Section specifies furnishing and installing Surface-Applied Detectable/Tactile Warning Tiles where indicated. For asphalt concrete (AC) paving applications, please refer to manufacturer recommendations in Paragraph 3.02 of this Section.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's literature describing products, installation procedures and routine maintenance.

B. Samples for Verification Purposes: Submit two (2) tile samples minimum 6"x6" of the kind proposed for use.

C. Shop drawings are required for products specified showing fabrication details, composite structural system, tile surface profile, fastener locations, sound on cane contact amplification feature, plans of tile placement including joints, and material to be used as well as outlining installation materials and procedure.

D. Material Test Reports: Submit complete test reports from qualified accredited independent testing laboratories to qualify that materials proposed for use are in compliance with requirements and meet or exceed the properties indicated on the specifications. All tests shall be conducted on a Surface Applied Detectable/Tactile Warning Surface Tile system as certified by a qualified independent testing laboratory and be current within a 24 month period.

E. Maintenance Instructions: Submit copies of manufacturer's specified installation and maintenance practices for each type of Detectable Warning Surface Tile and accessory as required.

1.04 QUALITY ASSURANCE

A. Provide Surface Applied Detectable/Tactile Warning Surface Tiles and accessories as produced by a single manufacturer with a minimum of three (3) years experience in the manufacturing of Surface Applied Detectable/Tactile Warning Surface Tiles.

B. Installer's Qualifications: Engage an experienced Installer certified in writing by Surface Applied Detectable/Tactile Warning Surface Tile manufacturer as qualified for installation, who has successfully completed installations similar in material, design, and extent to that indicated for Project.

C. Americans with Disabilities Act (ADA): Provide Surface Applied Detectable/Tactile Warning Surface Tiles which comply with the detectable warnings on walking surfaces section of the Americans with Disabilities Act (Title III Regulations, 28 CFR Part 36 ADA STANDARDS FOR ACCESSIBLE DESIGN, Appendix A, Section 4.29.2 DETECTABLE WARNINGS ON WALKING SURFACES).

D. California Code of Regulations (CCR): Provide only approved DSAAC detectable warning products as provided in the California Code of Regulations (CCR) Title 24, Part 2, Section 205 definition of ”Detectable Warning”. Section 1117A.4 and 1127B.5 for ”Curb Ramps” and Section 1133B.8.5 for "Detectable Warnings at Hazardous Vehicular Areas”.

E. Vitrified Polymer Composite (VPC) Surface Applied Detectable/Tactile Warning Surface Tiles shall be an epoxy polymer composition with an ultra violet stabilized coating employing aluminum oxide particles in the truncated domes. The tile shall incorporate an in-line pattern of truncated domes measuring nominal 0.2” height, 0.9” base diameter, and 0.45” top diameter, spaced center-to-center 2.35” as measured on a diagonal and 1.67” as measured side by side. For wheelchair safety the field area shall consist of a non-slip surface with a minimum of 40 - 90° raised points 0.045” high, per square inch; ”Armor-Tile” as manufactured by Engineered Plastics Inc., Tel: 800-682-2525, or approved equal. ADA Surface Applied Tactile Tiles April 2007 Section 32 17 26-1

1. Dimensions: Surface Applied Detectable/Tactile Warning Surface Tiles shall be held within the following dimensions and tolerances:

   Length and Width: 36x48
   Nominal Depth: 0.1875 (3/16”), (+/-) 5% max.
   Face Thickness: 0.1875 (3/16), (+/-) 5% max.
   Warpage of Edge: 0.5% max.

2. Water Absorption of Tile when tested by ASTM D 570-98 not to exceed 0.05%.

3. Slip Resistance of Tile when tested by ASTM C 1028-96 the combined Wet and Dry Static Co-Efficients of Friction not to be less than 0.80 on top of domes and field area.

4. Compressive Strength of Tile when tested by ASTM D 695-02a not to be less than 28,000 psi.

5. Tensile Strength of Tile when tested by ASTM D 638-03 not to be less than 19,000 psi.

6. Flexural Strength of Tile when tested by ASTM D 790-03 not to be less than 25,000 psi.

7. Chemical Stain Resistance of Tile when tested by ASTM D 543-95 (re approved 2001) to withstand without discoloration or staining - 10% hydrochloric acid, urine, saturated calcium chloride, black stamp pad ink, chewing gum, red aerosol paint, 10% ammonium hydroxide, 1% soap solution, turpentine, urea 5%, diesel Fuel and motor oil.

8. Abrasive Wear of Tile when tested by BYK - Gardner Tester ASTM D 2486-00 with reciprocating linear motion of 37± cycles per minute over a 10” travel. The abrasive medium, a 40 grit Norton Metallite sand paper, to be fixed and leveled to a holder. The combined mass of the sled, weight and wood block is to be 3.2 lb. Average wear depth shall not exceed 0.060 after 1000 abrasion cycles when measured on the top surface of the dome representing the average of three measurement locations per sample.

9. Resistance to Wear of Unglazed Ceramic Tile by Taber Abrasion per ASTM C501-84 (re approved 2002) shall not be less than 500.

10. Fire Resistance of Tile when tested to ASTM E 84-05 flame spread shall be less than 15.

11. Gardner Impact to Geometry "GE" of the standard when tested by ASTM D 5420-04 to have a mean failure energy expressed as a function of specimen thickness of not less than 550 in. lbf/in. A failure is noted when a crack is visible on either surface or when any brittle splitting is observed on the bottom plaque in the specimen.

12. Accelerated Weathering of Tile when tested by ASTM G 155-05a for 3000 hours shall exhibit the following result – $\Delta E < 3$, as well as no deterioration, fading or chalking of surface of tile Federal Color No. 33538.

13. Accelerated Aging and Freeze Thaw Test of Tile and Adhesive System when tested to ASTM D 1037-99 shall show no evidence of cracking, delamination, warpage, checking, blistering, color change, loosening of tiles or other detrimental defects.

14. Salt Spray Performance of Tile and Adhesive System when tested to ASTM B 117-03 not to show any deterioration or other defects after 200 hours of exposure.

1.05 DELIVERY, STORAGE AND HANDLING

A. Surface Applied Detectable/Tactile Warning Surface Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings and tile type shall be identified by part number.

B. Surface Applied Detectable/Tactile Warning Surface Tiles shall be delivered to location at building site for storage prior to installation.

1.06 SITE CONDITIONS

A. Environmental Conditions and Protection: Maintain minimum temperature of 40°F in spaces to receive Surface Applied Detectable/Tactile Warning Surface Tiles for at least 24 hours prior to installation, during installation, and for not less than 24 hours after installation.

B. The use of water for work, cleaning or dust control, etc. shall be contained and controlled and shall not be allowed to come into contact with the general public. Provide barricades or screens to protect the general public. ADA Surface Applied Tactile Tiles April 2007 Section 32 17 26-2

1.07 GUARANTEE

A. Surface Applied Detectable/Tactile Warning Surface Tiles shall be guaranteed in writing for a period of five (5) years from date of final completion. The guarantee includes defective work, breakage, deformation, fading and loosening of tiles.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. The Vitrified Polymer Composite (VPC) Surface Applied Detectable/Tactile Warning Surface Tile specified is based on Armor-Tile manufactured by Engineered Plastics Inc. (800-682-2525). Existing engineered and field tested products, which have been in successful service for a period of three (3) years are subject to compliance with requirements, may be incorporated in the work and shall meet or exceed the specified test criteria and characteristics.

Color: Yellow conforming to Federal Color No. 33538. Color shall be homogeneous throughout the tile.

B. Or Approved Equal.

2.02 MATERIALS

A. Fasteners: Color matched, corrosion resistant, flat head drive anchor: 1/4” diameter x 1-1.2” long as supplied by Engineered Plastics Inc.

B. Adhesive: Armor-Bond as supplied by Engineered Plastics Inc.

C. Sealant: Armor-Seal as supplied by Engineered Plastics Inc.

3.00 EXECUTION

3.01 INSTALLATION

A. During all surface preparation and Surface Applied Detectable/Tactile Warning Surface Tile installation procedures, ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.

B. The application of all tiles, adhesives, mechanical fasteners, and caulking shall be in strict accordance with the guidelines set by their respective manufacturers. Not recommended for asphalt applications.

If applied to asphalt surfaces, please note the installation instructions recommended by the manufacturer in 3.02 below.

C. Coordinate with the Contractor or Engineer to ensure that the surfaces being prepared and fabricated to receive the tiles are constructed correctly and adequately for tile installation. Review manufacturer and contract drawings with the Contractor prior to the construction and refer any and all discrepancies to the Engineer.

D. Set the tile true and square to the curb ramp area as detailed in the design drawings, so that its location can be marked on the concrete surface. A thin permanent marker works well. Remove tile when done marking its location.

E. The surface to receive the Surface Applied Detectable/Tactile Warning Surface Tile is to be mechanically cleaned with a diamond cup grinder or shot blaster to remove any dirt or foreign material. This cleaning and roughening of the concrete surface should include at least 4 inches around the perimeter of the area to receive the tile, and also along the cross pattern established by the corresponding areas on the backside of the tile. Those same areas should then be cleaned with a clean rag soaked in Acetone.

F. Immediately prior to installing the Surface Applied Detectable/Tactile Warning Surface Tile, the concrete surfaces must be inspected to ensure that they are clean, dry, free of voids, curing compounds, projections, loose material, dust, oil, grease, sealers and determined to be structurally sound and cured for a minimum of 30 days.

G. Using Acetone, wipe the backside of the tile around the perimeter and along the internal cross pattern, to remove any dirt or dust particles from the area to receive the adhesive.

H. Apply Armor-Bond adhesive to the backside of the tile, following the perimeter and internal cross pattern established by the tile manufacturer. Sufficient adhesive must be placed on the prescribed areas to have full coverage across the 2” width of the adhesive locator and shall be applied to within 1/4” continuously around the perimeter edge of the tile. The entire tube of adhesive shall be applied to the back of each tile, sizes 24” x 36”
and greater. ADA Surface Applied Tactile Tiles April 2007 Section 32 17 26-3

I. Set the tile true and square to the curb ramp area as detailed in the design drawings.

J. Working from the center of the tile outwards, proceed to drill and install all fasteners in the tile’s molded recesses.

K. Standing with both feet applying pressure around the molded recess provided in the tile, drill a hole true and straight to a depth of 3½” using a 1/4” masonry drill bit. Drill through the tile without hammer option (on the drill) until the tile has been successfully penetrated, then with hammer option (on the drill) to drill into the concrete. Maintaining foot pressure on both sides of the hole
while drilling prevents concrete dust from accumulating between the tile and concrete which can affect the tile being installed flush and may compromise installation integrity.

L. Immediately after drilling each hole, before moving on to the next, and while still applying foot pressure, mechanically fasten tiles to the concrete substrate using a leather bound or hard plastic mallet to set the fasteners. Ensure the fastener has been placed to full depth in the dome, straight, and flush to the top of dome. Drive the pin of the fastener with the mallet, taking care to avoid any inadvertent blows to the truncated dome or tile surface.

M. Following the installation of the fasteners, the concrete dust should be vacuumed, brushed or blown away from the tile’s surface and adjacent concrete. Using Acetone on a rag, wipe the concrete around the tile’s perimeter to ensure a clean, dry surface to receive perimeter sealant.

N. Armor-Seal perimeter caulking sealant should be applied following the sealant manufacturer's recommendations. Tape all perimeter edges of the tile back 1/16" from the tile's perimeter edge and tape the adjacent concrete back 1/2" from the tile's perimeter edge to maintain a straight and even caulking line. Apply sealant around tile perimeter using care to work sealant into any void between the tile and concrete interface. Tool the perimeter caulking with a rounded plastic applicator or spatula to create a cove profile between the tile and adjacent concrete. Remove tape immediately after tooling perimeter caulking sealant.

O. Do not allow foot traffic on installed tiles until the perimeter caulking sealant has cured sufficiently to avoid tracking. Curing time is weather dependant (average cure time at 75° F is 30 minutes). Adhesive or caulking on the surface of the Armor-Tile can be removed with Acetone.

P. If installing adjacent tiles, note the orientation of each tile. Careful attention will reveal that one of the long edges of the tile is different than the other in regard to the tiny dotted texture. You may also note a larger perimeter margin before the tiny dotted texture pattern begins. Consistent orientation of each Armor-Tile is required in order that the truncated domes on adjacent tiles line up with each other.

Q. In order to maintain proper spacing between truncated domes on adjacent tiles, the tapered edge should be trimmed off using a continuous rim diamond blade in a circular saw or mini-grinder. The use of a straightedge to guide the cut is required. All cuts should be made prior to installation of the tiles. If installing adjacent tiles, care should be taken to leave a 1/8 inch gap between each tile to allow for expansion and contraction.

R. If tiles are custom cut to size, if pre-molded recesses (to receive fasteners) are removed by the cut, or to maintain a tight installation to the substrate then any truncated dome can be center-drilled with a 1/4 inch masonry drill bit to create a through hole, and the through hole must be countersunk with a suitable carbide countersink bit to receive mechanical fasteners. Care should be taken to not countersink too widely or deeply. Fasteners should be flush with the top of the truncated dome when countersunk properly.

3.02 For asphalt concrete (AC) paving applications, the surface of AC paving shall be treated and sealed by Sinak tactile preparation compound manufactured by Sinak Corporation, (800) 523-3147, www.sinak.com, prior to installation of the detectable warning tiles. Please refer to surface preparation and installation instructions by manufacturer for AC paving applications.

3.03 CLEANING, PROTECTING AND MAINTENANCE

A. Protect tiles against damage during construction period to comply with Tactile Tile manufacturer's specification.

B. Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood.

C. Clean Tactile Tiles not more than four days prior to date scheduled for inspection intended to establish date of substantial completion in each area of project. Clean Tactile Tile by method specified by Tactile Tile manufacturer.

D. Comply with manufacturers maintenance manual for cleaning and maintaining tile surface and it is recommended to perform annual inspections for safety and tile integrity.

END OF SECTION

SECTION 03 31 00
CAST-IN-PLACE CONCRETE

1.00 GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

A. Extent of concrete work is shown on drawings.

B. Concrete paving and walks are specified in Division 2.

C. Precast concrete is specified in other Division-3 sections.

D. Mechanical finishes and concrete floor toppings are specified in other Division-3 sections.

1.03 SUBMITTALS:

A. Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others as requested by Architect.

B. Shop Drawings; Reinforcement: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

C. Samples: Submit samples of materials as requested by Architect, including names, sources, and descriptions.

D. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test.

1.04 QUALITY ASSURANCE:

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

1. ACI 301 "Specifications for Structural Concrete for Buildings".

2. ACI 318 "Building Code Requirements for Reinforced Concrete".

3. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice".

4. California Building Code.

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

1.05 PROJECT CONDITIONS:

A. Protection of Footings Against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.

B. Protect adjacent finish materials against spatter during concrete placement.

2.00 PRODUCTS

2.01 FORM MATERIALS:

A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

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

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

C. Forms for Cylindrical Columns and Supports: Metal, fiberglass reinforced plastic, or paper or fiber tubes. Construct paper or fiber tubes of laminated plies using water-resistant adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist loads imposed by wet concrete without deformation.

D. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

E. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units which will leave no metal closer than 1-1/2" to surface.

1. Provide ties which, when removed, will leave holes not larger than 1" diameter in concrete surface.

2.02 REINFORCING MATERIALS:

A. Reinforcing Bars: ASTM A 615, deformed, Grade as specified on structural drawings, except ASTM A 706, Grade 60 where bars are to be welded.

B. Steel Wire: ASTM A 82, plain, cold-drawn steel.

C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

D. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

2.03 CONCRETE MATERIALS:

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

B. Use one brand of cement throughout project.

C. Fly ash is not permitted on this project.

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

E. Do not use fine or coarse aggregates containing spalling-causing deleterious substances.

F. Lightweight Aggregates: ASTM C 330. 110 pcf concrete. (Not used on this project).

G. Water: Drinkable.

H. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

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

a. "Sika Aer"; Sika Corp.
b. "MB-VR or MB-AE"; Master Builders.
c. "Darex AEA" or "Daravair"; W.R. Grace.

I. Water-Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.1 percent chloride ions.

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

a. "WRDA Hycol"; W.R. Grace.
b. "Pozzolith Normal"; Master Builders.
c. "Plastocrete 160"; Sika Chemical Corp.

J. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G and containing not more than 0.1 percent chloride ions.

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

a. "WRDA 19" or "Daracem"; W.R. Grace.
b. "Super P"; Anti-Hydro.
c. "Sikament"; Sika Chemical Corp.
d. "Rheobuild"; Master Builders.

K. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C494, Type E, and containing not more than 0.1 percent chloride ions.

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

a. "Pozzolith High Early"; Master Builders.

L. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and containing not more than 0.1 percent chloride ions.

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

a. "Pozzolith Retarder"; Master Builders.
b. "Daratard"; W.R. Grace.
c. "Plastiment"; Sika Chemical Co.

M. Prohibited Admixtures: Calcium chloride thyocyanates or admixtures containing more than 0.1 percent chloride ions are not permitted.

2.04 RELATED MATERIALS:

A. Reglets: Where resilient or elastomeric sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 26 gage galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

B. Waterstops: Provide flat, dumbbell type or center-bulb type waterstops at construction joints and other joints as indicated. Size to suit joints.

C. Rubber Waterstops: Corps of Engineers CRD-C 513.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

a. The Burke Co.
b. Progress Unlimited.
c. Williams Products.
d. Edoco Technical Products.

D. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C572.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which maybe incorporated in the work include, but are not limited to, the following:

a. AFCO Products.
b. The Burke Co.
c. Edoco Technical Products.
d. Greenstreet Plastic Products.
e. Harbour Town Products.
f. W.R. Meadows.
g. Progress Unlimited.
h. Schleigel Corp.
i. Vinylex Corp.

E. Granular Base: Evenly graded mixture of fine and coarse aggregates to provide, when compacted, a smooth and even surface below slabs on grade.

F. Vapor Retarder: Provide vapor retarder cover over prepared base material where indicated below slabs on grade. Use only materials which are resistant to decay when tested in accordance with ASTM E 154, as follows:

1. Polyethylene sheet not less than 10 mils thick.

G. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.

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

a. Non-metallic:

"Sika Grout 212"; Sika Corp.
"Five Star Grout"; U.S. Grout Corp.

b. Metallic: Not allowed.

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

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

a. "Saniseal"; Master Builders.
b. "Burk-O-Lith"; The Burke Co.

I. Non-slip Aggregate Finish: Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than 40 percent aluminum oxide and not less than 25 percent ferric oxide. Use material that is factory-graded, packaged, rust-proof, and non-glazing, and is unaffected by freezing, moisture, and cleaning materials.

J. Colored Wear-Resistant Finish: Packaged, dry, combination of materials, consisting of portland cement, graded quartz aggregate, coloring pigments, and plasticizing admixture. Use coloring pigments that are finely ground, non-fading mineral oxides, interground with cement. Color as selected by Architect, unless otherwise indicated.

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

a. "Colorcron"; Master Builders.

K. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

L. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.

2. Polyethylene film.

3. Polyethylene-coated burlap.

M. Liquid Membrane-Forming Curing Compound: Liquid type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.055 gr./sq.cm. when applied at 200 sq.ft./gal.

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

a. "Masterseal"; Master Builders.
b. "A-H 3 Way Sealer"; Anti-Hydro Waterproofing Co.
c. "J-20 Acrylic Cure"; Dayton Superior.
d. "Spartan-Cote"; The Burke Co.

N. Bonding Compound: Polyvinyl acetate or acrylic base.

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

a. Acrylic or Styrene Butadiene:

"J-40 Bonding Agent"; Dayton Superior Corp.
"Acrylic Bondcrete"; The Burke Co.
"Daraweld C"; W.R. Grace

O. Epoxy Adhesive: ASTM C 881, two component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.

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

"Thiopoxy"; W.R. Grace.
"Sikadur Hi-Mod"; Sika Chemical Corp.
"Patch and Bond Epoxy"; The Burke Co.

2.05 PROPORTIONING AND DESIGN OF MIXES:

A. An approved Testing Laboratory shall prepare design mixes for each type and strength of concrete which shall be certified by a registered Civil Engineer licensed in California. Refer to General Notes on structural drawings for additional mix design requirements.

B. Submit written reports to Architect and Structural Engineer for each proposed mix design at least 14 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.

C. Admixtures:

1. Use water-reducing admixture or high range water-reducing admixture (super plasticizer) in concrete as required for placement and workability.

2. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg. F (10 deg. C).

3. Use high-range water-reducing admixture in pumped concrete, concrete for industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water/cement ratios below 0.50.

4. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or-minus 1-1/2 percent within following limits:

a. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or subjected to hydraulic pressure:

4.5 percent (moderate exposure); 5.5 percent(severe exposure) 1-1/2" max. aggregate. 4.5 percent (moderate exposure); 6.0 percent (severe exposure) 1" max. aggregate.

5.0 percent (moderate exposure); 6.0 percent(severe exposure) 3/4" max. aggregate.

5.5 percent (moderate exposure); 7.0 percent(severe exposure) 1/2" max. aggregate.

b. Other Concrete (not exposed to freezing, thawing, or hydraulic pressure): 2 percent to 4 percent air.

c. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.

d. Slump Limits: Proportion and design mixes to result in concrete slumps as specified on structural drawings.

e. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

f. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

3.00 EXECUTION

3.01 GENERAL:

A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.02 FORMS:

A. Design, erect, support, brace, and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347.

B. Design formwork to be readily removable without impact, shock, or damage to cast-in-place concrete surfaces and adjacent materials.

C. Construct forms to sizes, shapes, lines, and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

G. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retightening forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.03 VAPOR RETARDER INSTALLATION:

A. Following leveling and tamping of granular base for slabs on grade, place vapor retarder sheeting with longest dimension parallel with direction of pour.

B. Lap joints 6" and seal with appropriate tape.

C. After placement of moisture barrier, cover with granular material and compact to depth as shown on drawings.

3.04 PLACING REINFORCEMENT:

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

1. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials, which reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.05 JOINTS:

A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Architect.

B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs, and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.

C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.

D. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions.

E. Contraction (Control) Joints in Sidewalks and Slabs-on-Ground: Construct contraction joints to form panels of patterns as shown. Joints shall not be saw cut. Joints shall be hand tooled 1/8” wide and 1” deep, or ¼ of the slab depth for slabs thicker than 4”, unless otherwise indicated.

F. Form contraction joints by inserting premolded plastic, hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.

1. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

G. If joint pattern not shown, provide joints not exceeding 20' in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third-bays).

1. Joint sealant material is specified in Division-7 sections of these specifications.

3.06 INSTALLATION OF EMBEDDED ITEMS:

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.

B. Install reglets to receive top edge of foundation sheet waterproofing, and to receive thru-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

C. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.07 PREPARATION OF FORM SURFACES:

A. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.

B. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

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

D. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.08 CONCRETE PLACEMENT:

A. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

1. Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.

B. General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as herein specified.

C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

E. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

F. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

G. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

H. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

I. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

J. Maintain reinforcing in proper position during concrete placement operations.

K. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

L. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C), and not more than 80 deg F (27deg C) at point of placement.

M. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

N. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

O. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

P. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C).Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.

Q. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

R. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.

S. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.09 FINISH OF FORMED SURFACES:

A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

B. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete surfaces which have received smooth form finish treatment.

D. Combine one part portland cement to 1-1/2 parts fine sand by volume, and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.

E. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

F. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES:

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.

1. After placing slabs, plane surface to tolerances for floor flatness (F) of 15 and floor levelness (F) of 13. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms, or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

1. After screeding, consolidating, and leveling concrete slabs do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both, Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances of F 18 - F 15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.

1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of F 20- F 17. Grind smooth surface defects, which would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.

E. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

F. Chemical-Hardener Finish: Apply chemical-hardener finish to interior concrete floors where indicated. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water (parts of hardener/water as follows), and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat, 2/3-strength. Evenly apply each coat, and allow 24 hours for drying between coats.

1. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.

2. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

G. Colored Wear-Resistant Finish: Provide colored wear-resistant finish to monolithic slab surface indicated.

1. Apply dry shake materials for colored wear-resistant finish at rate of not less than 60 lbs. per 100 sq. ft., unless greater amount is recommended by material manufacturer.

2. Immediately following first floating operation uniformly distribute approximately 2/3 of required weight of dry shake material over concrete surface, and embed by means of power floating. Follow floating operation with second shake application, uniformly distributing remainder of dry shake material at right angles to first application, and embed by power floating.

3. After completion of broadcasting and floating, apply trowel finish as herein specified. Cure slab surface with curing compound recommended by dry shake hardener manufacturer. Apply curing compound immediately after final finishing.

3.11 CONCRETE CURING AND PROTECTION:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Cure concrete in accordance with ACI 308 recommendations.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 and ACI 308 procedures. Avoid rapid drying at end of final curing period.

D. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.

E. Provide moisture curing by following methods.

1. Keep concrete surface continuously wet by covering with water.

2. Continuous water-fog spray.

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

F. Provide moisture-cover curing as follows:

1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

G. Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walks, and curbs, as follows:

1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

H. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to Architect.

I. Curing Formed Surfaces: Cure formed concrete surfaces, including under sides of beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

J. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.

K. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

L. Sealer and Dustproofer: Apply a second coat of specified curing and sealing compound only to surfaces given a first coat.

3.12 SHORES AND SUPPORTS:

A. Comply with ACI 347 for shoring and reshoring in multistory construction, and as herein specified.

B. Extend shoring from ground to roof for structures 4 stories or less, unless otherwise permitted.

C. Extend shoring at least 3 floors under floor or roof being placed for structures over 4 stories. Shore floor directly under floor or roof being placed, so that loads from construction above will transfer directly to these shores. Space shoring in stories below this level in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members, where no reinforcing steel is provided. Extend shores beyond minimums to ensure proper distribution of loads throughout structure.

D. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.

E. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.13 REMOVAL OF FORMS:

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F(10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

1. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.14 RE-USE OF FORMS:

A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.15 MISCELLANEOUS CONCRETE ITEMS:

A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

D. Grout base plates and foundations as indicated, using specified non-shrink grout.

E. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories, as shown on drawings. Screed, tamp, and finish concrete surfaces as scheduled.

3.16 CONCRETE SURFACE REPAIRS:

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.

B. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

C. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

D. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

E. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.

G. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

H. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

I. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.

J. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

K. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No.16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

L. Perform structural repairs with prior approval of Architect or Structural Engineer for method and procedure, using specified epoxy adhesive and mortar.

M. Repair methods not specified above may be used, subject to acceptance of Architect.

3.17 QUALITY CONTROL TESTING DURING CONSTRUCTION:

A. The Owner will employ a testing laboratory to perform tests and to submit test reports.

B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.

C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.

2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

3. Concrete Temperature: Test hourly when air temperature is 40 deg F (4 deg C) and below, and when 80 deg F (27 deg C) and above; and each time a set of compression test specimens made.

4. Compression Test Specimen: ASTM C 31; one set of 3 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens, except when field-cure test specimens are required.

5. Compressive Strength Tests: ASTM C 39; one set for each 150 cu. yds. placed and a minimum of one set for each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days.

6. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

7. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

D. Test results will be reported in writing to Architect, Structural Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name, number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

F. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

END OF SECTION

SECTION 04 22 00
CONCRETE UNIT MASONRY (CMU)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the Contract, including, but not limited to, these major items:

a. Concrete masonry units.

b. Precast concrete caps.

c. Vertical and horizontal reinforcing and dowels projecting into subsequently placed concrete.

d. Setting of flashing and other work to be embedded in masonry.

B. Work installed but furnished in other Sections:

1. Sleeves, inserts and similar items furnished by other trades for installation in masonry.

C. Related sections:

1. Section 03 30 00 - Cast-In-Place Concrete: Concrete, including dowels installed in concrete, placed prior to installation of masonry work, for anchorage of masonry.

2. Section 05 50 00 Metal Fabrications: Furnishing items to be embedded in masonry.

3. Section 07 19 00 Water Repellent Coating.

4. Section 07 60 00 Flashing and Sheet Metal.

5. Section 07 92 00 Joint Sealants.

1.2 DEFINITIONS AND REFERANCES

A. ASTM A615 - Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.

B. ASTM C33 - Concrete Aggregates.

C. ASTM C90 - Test Method Pullout Strength for Hardened Concrete.

D. ASTM C114 -Test Methods for Chemical Analysis of Hydraulic Cement.

E. ASTM C144 - Aggregate for Masonry Mortar.

F. ASTM C150 - Portland Cement.

G. ASTM C207 - Hydrated Lime for Masonry Purposes.

H ASTM C404 – Aggregates for Masonry Grout.

1.3 SUBMITTALS

A. Procedures: In accordance with requirements of Section 01300.

B. Product data: Manufacturer's information for all specified items.

C. Samples: Samples of all blocks used in the work.

D. Sample panel: Erect a 3' high x 4' long sample panel of concrete block masonry. After review and acceptance by Architect, ensure that all masonry work matches accepted panel.

E. Certificates: Prior to delivery, submit certificates attesting compliance of CMU with applicable specifications for grades, types or classes.

1.4 QUALITY ASSURANCE

A. Regulatory requirements:

1. Materials and work: Conform to California Building Code latest edition, Chapter 21, Title 24, Part 2, California Code of Regulations latest edition. In case of conflict between these specifications and Building Codes, the more stringent shall govern.

2. Provide for testing and quality control per CBC Sections 2105A.1 and 2105A.2.1.

3. NOTE! All structural masonry requires continuous inspection by an inspector approved by enforcement agency.

B. Verify that masonry units have been cured for 28 days before delivery to project site.

1.5 PRODUCT HANDLING

A. Procedures: In accordance with Section 01600.

B. Deliver reinforcement to site bundled, tagged and marked; handle to prevent damage to material. Use metal tags indicating size, length and other markings shown on placement drawings. Maintain tags after bundles are broken.

C. Protection: Safeguard all materials against injury in transit, delivery, storage, sorting, installation, cleaning, and until final acceptance of completed work.

D. Store cement and lime in rain proof sheds with elevated floors.

E. Store sand on tightly floored space, protected against mixing with ground or other materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCT

A. Manufacturer: Orco Block Co., Inc.

B. Specified manufacturer establishes a standard of quality, function and design for this project. Other acceptable manufacturers having equivalent products may be used only with Architect's approval.

1. Alternate manufacturers: Angelus Block Company, or equal.

2.2 MATERIALS

A. Concrete block units: ASTM C90, Grade N-1, hollow, medium weight, load bearing units. Aggregates - ASTM C33. Sizes and types as shown on drawings. Provide open end units, special sizes and special shapes shown on drawings.

1. Masonry units: Cured for not less than 28 days when placed in structure and have a maximum linear shrinkage of 0.06% from saturated to over-dry condition, when tested according to methods published in Quality Control Standards of Concrete Masonry Association.

2. Colors: To be selected by Architect from manufacturer's full range of colors and textures.

B. Portland cement: ASTM C150, Type II; standard brand, containing not more than 0.6% total alkali, where calculated as sodium oxide in accordance with ASTM C114. Use only one brand.

1. Plastic cement is not acceptable.

C. Sand: ASTM C144. For grout, not less than 3% shall pass the No. 100 sieve.

D. Pea gravel: ASTM C404. Clean, hard, containing not more than 5% by weight of flat, thin, elongated, friable, or laminated pieces; uniformly graded with not over 5% passing a No. 8 sieve to 100% passing a 3/8" sieve.

E. Lime putty: Make from hydrated lime conforming to ASTM C207, Type S, pulverized to such fineness that 100% will pass a 50 mesh sieve. Mix lime in water, run through screen into box, and age 48 hours.

F. Reinforcing steel: ASTM A615, Grade 60 except rebar sizes. No. 3 and No. 4 may be grade 40.

G. Water: Clean; from a source intended for domestic consumption.

H. Admixtures: Red Label for mortar, and Grout Aid Type II for grout, both by Sika Corporation. Use is at Contractor's option.

I. Concrete cap: Size as shown on drawings. Color to match adjacent CMU.

2.3 MORTAR AND GROUT

A. Mixes: Design by a testing laboratory, select and pay for by Contractor.

1. Plastic cement is not acceptable.

B. Compressive strengths at 28 days shall be as shown on the structural drawings. If not shown, use the following as a minimum:

1. Typical walls.

a.	Block Units	2600 psi
b.	Mortar (Type M or S)	2400 psi
c.	Grout	2700 psi

C. Mixing: Mix water, and cement for two minutes, then add lime and admixture, continue mixing in a mechanically operated batch mixer; a continuous mortar mixer will not be permitted. Mix to maintain a slump of from 2 1/2" to 3".

D. Discard mortar and grout not used within 30 minutes after leaving mixer. Retempering of mixture shall not be allowed.

2.4 QUALITY CONTROL OF MASONRY CONSTRUCTION

A. The compressive strength of concrete masonry shall be determined by the **PRISM TEST METHOD** prior to the start of construction and during construction per CBC, section 2105A.2.2.2.

B. Mortar and grout sample shall be taken for test to establish whether the masonry components meet the specified component strengths per CBC, section 2105A.5.

C. Masonry core test shall be performed to determine the quality of the masonry constructed per CBC, section 2105A.4.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine adjacent construction and supports. Verify that surfaces are within allowable tolerances, plumb, level, clean, and will provide solid anchoring surfaces.

B. Correct conditions detrimental to proper or timely completion of this work before proceeding with installation.

3.2 SCAFFOLD AND PROTECTION

A. Provide and maintain scaffolding, staging and forms of protection necessary for execution of work, as required, substantially constructed, moved and dismantled as necessary to properly follow sequence of operations.

3.3 SHORES AND CENTERING

A. Provide shores and centering for work, constructed true to required shape, size and form, well braced and made rigid, and capable of supporting and sustaining loads to which subjected. Leave shores and centering in place until the masonry is sufficiently set to safely carry its own weight and added loads of construction.

3.4 PLACING REINFORCEMENT

A. Reinforcement steel, except dowels in other material. Accurately set and place strictly as shown or noted. In spaces containing reinforcement, except small rods or mesh one-quarter inch or less in diameter, the clear distances between masonry and the reinforcement shall be at least 1/4".

1. Vertical bars: Continuous from bottom of cell to top of wall, centered in cells, except where otherwise shown on drawings. Where necessary, hold vertical steel firmly in place by frames or other suitable devices as reviewed and accepted.

2. Horizontal bars: Wire temporarily above exact position and tag to correct locations shown on drawings. Use calibrated vertical markers to indicate correct location. Provide horizontal bars where shown on drawings, held in contact to vertical bars or dowels.

3.5 PREPARATION

A. Previously placed concrete or masonry: Clean of encrustation, laitance, oil, and coatings which would reduce bond, including sandblasting as required. Clean thoroughly and roughen contact surfaces of all foundations and floors that are to receive masonry work, before start of laying masonry units. Protect roughened surface during construction to assure a good bond between

grout fill and concrete surface. Wash surfaces thoroughly with water under pressure; leave surfaces damp where masonry units connect with earlier placed work.

B. Masonry units: Thoroughly clean of dust, grease, oil or other matter which would reduce bond.

C. Wetting: Protect concrete masonry unit against wetting before installation.

D. Reinforcement: Clean of mill scale; lose rust, oil and coatings which would reduce bond.

E. Obtain approval of methods of placement and fastening of reinforcement prior to start of work.

3.6 BONDING

A. Masonry bonding to concrete: Clean top surface of concrete. Remove laitance and expose aggregates before placing masonry units.

B. Lay up wall in straight uniform courses with regular running bond or as shown on drawings.

3.7 GROUTING - LOW LIFT

A. Low-lift grout if used shall conform to CBC, Section 2104A.6.1.1.2 and Section 2104A6.1.2.2.

B. Prior to grouting, clean grout space so that all spaces to be filled with grout do not contain mortar projections greater than 1/2", mortar drippings or other foreign material.

C. Maximum lift: 4 feet.

D. Grouting of the wall: Complete in one day, with no interruptions greater than one hour.

E. Fill all cells and spaces with grout.

F. Consolidate grout by mechanical vibration or other means which are approved by Division of State Architect, during placing, before loss of plasticity, in a manner to fill grout space without contacting reinforcing. Mechanical vibration requires use of high frequency vibration equipment producing 10,000 cycles per second, minimum, and sized as required.

3.8 GROUTING - HIGH LIFT

A. High-lift grout shall conform to CBC, Section 2104A.6.1.2.1 and Section 2104A6.1.2.3.

B. Construction requirements of high-lift grouted wall shall be per CBC, Section 2104A.6.2.

C. Additional requirements for high-lift grouted wall construction shall be per DSA IR 21-2.

3.9 BLOCK LAYING (GENERAL)

A. Notes: General Notes on structural drawings are part of this Section.

B. Preserve unobstructed vertical continuity of cells to be filled. Fully bed webs and cross-walls forming such cells in mortar to prevent leakage of grout. Strike joints around such cells smooth.

C. Fractional parts of masonry units are prohibited where whole units can be used. Chinking of interstices with fragments will not be allowed. Provide special units as necessary to form opening and lintels.

D. Install lintel units at lintels, corner units at corners.

E. No miters are permitted. No exposed cells are permitted.

F. No part of any masonry wall may be carried more than 3 feet higher than adjoining portions.

G. Where it is absolutely necessary, for construction purposes, to stop off longitudinal runs of masonry, stop off only racking back one-half unit length in each course. Toothing will not be permitted.

H. Execute masonry work according to best standards of practice for trade. Erect masonry plumb, square, straight and true to indicated lines, position and dimensions and in level courses.

I. Make provision for special units as required to form bond beams, openings and offsets and maintain a proper bond throughout entire length of wall.

J. Masonry units: Sound, dry, clean and free from cracks when placed in the structure.

K. Do not wet masonry units except in very dry weather, moisten contact surfaces of units immediately before laying.

L. Cut units accurately to fit openings for other work. Cut and patch holes neatly and accurately.

M. If it is necessary to move a unit after it has been once set in place, remove unit from wall, clean and set in fresh mortar.

N. Where necessary to cut concrete masonry units in order to conform to adjacent construction or to indicate joint pattern, saw masonry units with diamond or other abrasive saw to produce a straight, sharp edge without spalling or other defects. Cut units as required to maintain uniform joint widths throughout.

O. When possibility of rain occurs, cover tops of all walls exposed to weather, and all concrete masonry units with sheets of polyethylene, or other reviewed and accepted effective forms of protection, to prevent absorption of water. Store masonry units above ground if there is a possibility of surface flooding exists.

3.10 JOINTS

A. Exterior joints: Point mortar joints flush, using a pointing trowel, and then tool to a slight concave profile, making solid, smooth, watertight joints.

B. Interior joints: Strike flush and sack as work progresses.

C. Unless otherwise shown, make joints 3/8" thick with full mortar coverage on face shells and on webs surrounding cells to be filled.

D. Set lintels, capping units and bearing plates in a full bed of mortar.

3.11 BOLTS, ANCHORS AND REGLETS

A. Set bolts, anchors, reglets, and inserts necessary for attachment of subsequent work, and items furnished under other sections. Provide a minimum of 1" grout around all anchor bolts.

3.12 POINTING AND CLEANING

A. Leave exposed surfaces clean and free of surplus mortar or foreign material. Exercise care to keep grout and mortar droppings off finished surfaces.

1. Defective joints: Point holes or defective mortar joints, in exposed masonry, and where necessary, cut out defective joints and repoint.

2. Staining and excess mortar: Protect exposed masonry against staining. Where grout or mortar does contact faces of masonry, remove it immediately. Where accidental spillage occurs, wash and clean surfaces immediately.

3.13 FIELD QUALITY CONTROL

A. Contact testing laboratory to test mortar and grout to extent required by governing code. Core testing per CBC 2007, Section 2105A.4 and Section 2105A.5.

B. Whenever there is any evidence that materials to be used in masonry construction do not conform to the Contract Documents, test materials for compliance before being used in project.

C. District will pay for tests if they prove compliance with Contract Documents; otherwise costs of tests shall be paid by Contractor.

D. Continuous inspection: As required by structural drawings.

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL

1.00 GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

A. Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, typical connections, and type of steel required.

B. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.

C. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.

D. Refer to Division 3 for anchor bolt installation in concrete; Division 4 for masonry.

E. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

1. Promptly remove and replace materials or fabricated components which do not comply.

F. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.

1. Promptly notify Architect whenever members and connections for any portion of structure are not clearly indicated.

1.03 SUBMITTALS:

A. Product Data: Submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.

2. Structural steel primer paint.

3. Shrinkage-resistant grout.

B. Shop Drawings: Submit shop drawings prepared under supervision of a registered professional engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams.

C. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS A2.1 and A2.4 symbols, and show size, length, and type of each weld.

1. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of others sections.

D. Test Reports: Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of tests conducted and test results.

1.04 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:

1. AISC "Code of Standard Practice for Steel Buildings and Bridges".

2. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including "Commentary" and Supplements thereto as issued.

3. AISC "Specifications for Architecturally Exposed Structural Steel".

4. AISC "Specifications for Structural Joints using ASTM A325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

5. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".

6. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".

B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

a. If recertification of welders is required, retesting will be Contractor's responsibility.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials to site at such intervals to insure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

2.00 PRODUCTS

2.01 MATERIALS:

A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam

marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.

B. Structural Steel Shapes, Plates and Bars:

1. Wide flanges, ASTM A992.

2. Plates, ASTM A36.

3. Channels and angles, ASTM A36.

C. Cold-Formed Steel Tubing: ASTM A 500, Grade B.

D. Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501.

1. Finish: Black, except where indicated to be galvanized.

E. Anchor Bolts: ASTM F1554, Grade 36 and 105 headed bolts and threaded rods per drawings.

F. Expansion bolt fasteners: Hilti Anchors per drawings.

G. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts.

1. Provide hexagonal heads and nuts for all connections.

H. Electrodes for Welding: E-70 electrodes complying with AWS Code.

I. Structural Steel Primer Paint: SSPC - Paint 13, or fabricator's standard rust-inhibiting primer.

J. Non-metallic Shrinkage-Resistant Grout: Pre-mixed, non-metallic, non-corrosive, non-staining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CE-CRD-C621.

2.02 FABRICATION:

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

B. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

C. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

D. Connections: Provide welded or bolted connections, as indicated.

E. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

F. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.

G. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, where indicated.

H. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.

I. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.03 SHOP PAINTING:

A. General: Shop paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel which is partially exposed on exposed portions and initial 2" of embedded areas only.

1. Do not paint surfaces which are to be welded or high-strength bolted with friction-type connections.

2. Do not paint surfaces which are scheduled to receive sprayed-on fire proofing.

3. Apply two (2) coats of paint to surfaces which are in accessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Surface Preparation: After inspection and before shipping, clean steel work to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:

1. SP-1 "Solvent Cleaning".

2. SP-2 "Hand Tool Cleaning".

3. SP-3 "Power Tool Cleaning".

4. SP-5 "White Metal Blast Cleaning".

C. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods, which result in full coverage of joints, corners, edges and exposed surfaces.

2.04 EXPOSED STRUCTURAL STEEL COATING:

A. All exposed structural steel members shall receive Kynar coating,. See specifications section 09 94 00.

B. Structural steel framing members shall not require any fire-rated coating.

3.00 EXECUTION

3.01 ERECTION:

A. Surveys: Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect.

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

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

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

D. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

E. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.

F. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to grouting.

G. Grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.

1. For proprietary grout materials, comply with manufacturer's instructions.

H. Field Assembly: Set structural frames accurately to line and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces, which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

I. Level and plumb individual members of structure with in specified AISC tolerances.

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

K. Splice members only where indicated on structural drawings.

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

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

N. Do not enlarge unfair holes in members by burning or by use of drift pins. Ream holes that must be enlarged to admit bolts.

O. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in structural framing.

P. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

Q. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3.02 QUALITY CONTROL:

A. Owner will engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.

B. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.

C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

D. Testing agency may inspect structural steel at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.

E. Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.

F. Shop and Field Bolted Connections: Inspect or test in accordance with AISC specifications.

G. Shop and Field Welding: Inspect and test during fabrication of structural steel assemblies, as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

2. Perform visual inspection of all welds.

3. Perform tests of welds as follows:

a. Ultrasonic Inspection: ASTM E 164.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This section includes the following metal fabrications:

1. Rough hardware.
2. Ladders.
3. Ladder and safety cages.
4. Ship's ladders.
5. Stair Nosing.
6. Loose bearing and leveling plates.
7. Loose steel lintels.
8. Miscellaneous framing and supports for the following:
   a. Overhead doors.
   b. Suspended toilet partitions.
   c. Suspended folding partitions.
   d. Suspended operable partitions.
   e. Applications where framing and supports are not specified in other sections.
9. Miscellaneous steel trim.
10. Shelf and relieving angles.
11. Metal bar gratings.
12. Expanded metal gratings.
13. Floor plate and supports.
14. Tread plate and supports.
15. Steel pipe railings.
16. Cast treads and thresholds.

17. Metal stairs.

18. Pipe bollards.

19. Catwalks and Stage Rigging

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

1. Division 5 Section "Structural Steel".

2. Division 5 Section "Handrails and Railings".

1.03 DEFINITIONS

A. Definitions in ASTM E 985 for railing-related terms apply to this section.

1.04 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for products used in miscellaneous metal fabrications, including paint products and grout.

C. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other sections.

D. Samples representative of materials and finished products as may be requested by Architect.

E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.

F. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project name, addresses, names of Architects and Owners, and other information specified.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in successfully producing metal fabrications similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.

B. Installer Qualifications: Arrange for installation of metal fabrications specified in this section by same firm that fabricated them.

C. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel," D1.3 "Structural Welding Code - Sheet Steel", and D1.2 "Structural Welding Code -Aluminum."

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.06 PROJECT CONDITIONS

A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.

1.07 SEQUENCING AND SCHEDULING

A. Sequence and coordinate installation of wall handrails as follows:

1. Mount handrails only on completed walls. Do not support handrails temporarily by any means not satisfying structural performance requirements.

2. Mount handrails only on gypsum board assemblies reinforced to receive anchors, and where the location of concealed anchor plates has been clearly marked for benefit of Installer.

2.00 PRODUCTS

2.01 FERRUS METALS

A. Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.

B. Steel Plates, Shapes, and Bars: ASTM A 36.

C. Rolled Steel Floor Plates: ASTM A 786.

D. Steel Bars for Gratings: ASTM A 569 or ASTM A 36.

E. Wire Rod for Grating Cross Bars: ASTM A 510.

F. Steel Tubing: Cold-formed steel tubing, ASTM A 500, Grade B.

G. Uncoated Structural Steel Sheet: Product type (manufacturing method), quality, and grade, as follows:

1. Cold-Rolled Structural Steel Sheet: ASTM A 611, Grade A, unless otherwise indicated.

H. Uncoated Steel Sheet: Commercial quality, product type (method of manufacture) as follows:

1. Cold-Rolled Steel Sheet: ASTM A 366.

I. Galvanized Steel Sheet: Quality as follows:

1. Structural Quality: ASTM A 446; Grade A, unless another grade required for design loading, and G90 coating designation unless otherwise indicated.

J. Steel Pipe: ASTM A 53; finish, type, and weight class as follows:

K. Gray Iron Castings: ASTM A 48, Class 30.

L. Malleable Iron Castings: ASTM A 47, grade 32510.

M. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

N. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.

O. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded, and as indicated on drawings.

P. Metal Mesh / Screen: McNichols 1” and 2” square, 24 gauge wire cloth or approved equal. Vinyl coating is optional.

Q. 2” x 4” x 12.5 gauge welded wire mesh screen at Catwalks.

2.02 NONSHRINK NONMETALLIC GROUT

A. Premixed, factory-packaged, non-staining, noncorrosive, nongaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for type of application used.

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

1. "Masterflow 713"; Master Builders.

2. "Five Star Grout"; U.S. Grout Corp.

2.03 FASTENERS

A. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.

B. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.

C. Lag Bolts: Square head type, FS FF-B-561.

D. Machine Screws: Cadmium plated steel, FS FF-S-92.

E. Wood Screws: Flat head carbon steel, FS FF-S-111.

F. Plain Washers: Round, carbon steel, FS FF-W-92.

G. Drilled-In Expansion Anchors: Expansion anchors complying with FS FF-S-325, Group VIII (anchors, expansion, [non-drilling]), Type I (internally threaded tubular expansion anchor); and machine bolts complying with FS FF-B-575, Grade 5.

H. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class, and style as required.

I. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

J. Beam Clamps and Rigging Clamps

2.04 PAINT

A. Shop Primer for Ferrous Metal: Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure complying with performance requirements of FS TT-P-645.

B. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint-20.

C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos fibers.

D. Exposed steel shall have Kynar coating. See specifications section 09940.

2.05 FABRICATION, GENERAL

A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to properly complete the work. Work to dimensions indicated using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

C. Shear and punch metals cleanly and accurately. Remove burrs.

D. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Remove sharp or rough areas on exposed traffic surfaces.

F. Weld corners and seams continuously to comply with AWS recommendations and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

H. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

I. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

J. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.

K. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.06 ROUGH HARDWARE

A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.

B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.07 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports for applications indicated or which are not a part of structural steel framework, as required to complete work.

B. Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.

2.08 MISCELLANEOUS STEEL TRIM

A. Provide shapes and sizes indicated for profiles shown. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings, and anchorages as required for coordination of assembly and installation with other work.

2.09 FLOOR PLATE AND TREAD PLATE

A. Checkered steel plate-safety plate: U.S. steel's multigrip S- 400 or Inryco's 4-way medium pattern.

2.10 STEEL PIPE RAILINGS AND HANDRAILS

A. General: Fabricate pipe railings and handrails to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacing, and anchorage. Handrails shall be 1.25” to 1.50” diameter steel pipe hot dip galvanized and Kynar painted per specification section 09 94 00. Handrails shall be mounted 1.50” clear from side walls. CBC Sections 1133B.4.2.5 and 1133B.5.5.1. All welded joints and surfaces shall be ground smooth, no sharp or abrasive corners, edges, or surfaces. Wall surfaces adjacent to handrail shall be smooth. CBC Sections 1133B.4.2.6 and 1133B.5.5.1

B. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.

1. At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.

C. Form changes in direction of railing members by bending to preserve the contour of the member.

D. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.

E. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.

F. Close exposed ends of pipe by welding 3/16 inch thick steel plate.

G. Toe Boards: Where indicated, provide toe boards at railings around openings and at the edge of open-sided floors and platforms.

H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts other anchorage devices for connecting railings and handrails to concrete or masonry work.

1. For railing posts set in concrete fabricate sleeves from steel pipe with an inside diameter not less than 1/2 inch greater than the outside diameter of post, with steel plate closure welded to bottom of sleeve.

I. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses. Size fillers to produce adequate bearing to prevent bracket rotation and overstressing of substrate.

2.11 CAST TREADS AND THRESHOLDS

A. Fabricate units of material, sizes, and configurations indicated. If not indicated, provide cast-iron units with integral abrasive finish. Furnish in lengths as required to accurately fit each opening or conditions.

1. Cast units with an integral abrasive grit consisting of aluminum oxide, silicone carbide, or a combination of both.

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

American Abrasive Metals Co.
American Mason Safety Tread Co.
American Safety Tread Co., Inc.
Armstrong Products, Inc.
Safe-T-Metal Co., Inc.
Wooster Products Inc.

C. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with the manufacturer.

D. Apply black asphaltic coating to concealed bottoms, sides, and edges of cast-iron units set into concrete.

E. Provide a plain surface texture, except where fluted or cross-hatched surfaces are indicated. Provide 2” contrasting color (70% recommended) warning stripe of material at least as slip resistant as the other treads of the stairs, 1” max. from edge of nosing and top landing. At interior stairs, provide warning stripe at top and bottom tread nosing only. At exterior stairs, provide warning stripe at top landing and all tread nosings. CBC Section 1133B.4.4

2.12 STEEL FRAMED STAIRS

A. General: Construct stairs to conform to sizes and arrangements indicated. Join pieces together by welding, unless otherwise indicated. Provide complete stair assemblies, including metal framing, hangers, columns, railings, newels, balusters, struts, clips, brackets, bearing plates, and other components necessary for the support of stairs and platforms, and as required to anchor and contain the stairs on the supporting structure.

1. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM "Metal Stair Manual" for class of stair designated, except where more stringent requirements are indicated:

a. Commercial class, unless otherwise indicated.

b. Architectural class where indicated.

2. Fabricate treads and platforms of exterior stairs to accommodate slopes to drain in finished traffic surfaces.

B. Stair Framing: Fabricate stringers of structural steel channels, or plates, or a combination thereof, as indicated. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as indicated. Bolt or weld headers to strings, newels, and framing members to strings and headers; fabricate and join so that bolts, if used, do not appear on finish surfaces. Provide temporary support for stairs as required during construction.

C. Metal Pan Risers, Sub-treads, and Sub-platforms: Shape metal pans for risers and sub-treads to conform to configuration shown. Provide thicknesses of structural steel sheet for metal pans indicated, but not less than that required, to support total design loading.

1. Form metal pans of uncoated cold-rolled steel sheet, unless otherwise indicated.

2. Attach risers and sub-treads to stringers by means of brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting or bolting.

3. Provide sub-platforms of configuration and construction indicated sub-platform by welding.

D. Steel Floor Plate Treads and Platforms: Checkered steel plate - safety plate.

1. Form treads of raised pattern steel floor plate with integral nosing and back edge stiffener. Weld steel supporting brackets to stringers and treads to brackets.

2. Fabricate platforms of raised pattern steel floor plate of thickness indicated. Provide nosing matching that on treads at all landings. Secure with welds.

3. Provide 2” contrasting color (70% recommended) warning stripe of material at least as slip resistant as the other treads of the stairs, 1” max. from edge of nosing and top landing. At interior stairs, provide warning stripe at top and bottom tread nosing only. At exterior stairs, provide warning stripe at top landing and all tread nosings. CBC Section 1133B.4.4.

2.13 STEEL AND IRON FINISHES

A. Galvanizing: For those items indicated for galvanizing and all exposed items at exterior locations, apply zinc-coating by the hot-dip process compliance with the following requirements:

1. ASTM A 153 for galvanizing iron and steel hardware.

2. ASTM A 123 for galvanizing both fabricated and un-fabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick and heavier.

B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B): SSPC-SP6 "Commercial Blast Cleaning."

2. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning:

C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finish or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.

3.00 EXECUTION

3.01 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

B. Center nosing on tread widths with noses flush with riser faces and tread surfaces.

C. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

3.02 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint or zinc chromate primer.

3.03 SETTING LOOSE PLATES

A. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

B. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.

1. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.04 INSTALLATION OF SUPPORTS FOR TOILET PARTITIONS

A. Anchor supports securely to, and rigidly brace from, overhead building structure.

3.05 INSTALLATION OF METAL BAR GRATINGS

A. General: Install gratings to comply with recommendations of NAAMM grating standard referenced under Part 2 that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.

B. Secure removable units to supporting members with type and size of clips and fasteners indicated, or if not indicated as recommended by grating manufacturer for type of installation conditions shown.

C. Secure non-removable units to supporting members by welding where both materials are the same; otherwise, fasten by bolting as indicated above.

D. Attach toe plates to gratings by welding, at locations indicated.

3.06 INSTALLATION OF STEEL PIPE RAILINGS AND HANDRAILS

A. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:

1. Anchor posts in concrete by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with anchoring material manufacturer's directions.

a. Leave anchorage joint exposed, wipe off surplus anchoring material, and leave 1/8 inch build-up, sloped away from post. For installations exposed on exterior, or to flow of water, seal anchoring material to comply with grout manufacturer's directions.

2. Anchor posts to steel by welding as shown.

3. Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.

4. Anchor rail ends to steel by welding as shown.

B. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2 inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated. Secure wall brackets and wall return fittings to building construction as follows:

1. Use type of bracket with pre-drilled hole for exposed bolt anchorage.

2. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.

3. For wood stud partitions, use lag bolts set into wood backing between studs. Coordinate with stud installations for accurate location of backing members.

4. For steel framed gypsum board assemblies, fasten brackets directly to steel framing or concealed anchors using self-tapping screws of size and type required to support structural loads.

3.07 INSTALLATION OF CAST TREADS AND THRESHOLDS

A. Install cast treads and thresholds with anchorage system indicated to comply with manufacturer's recommendations.

B. Seal thresholds exposed to exterior with elastomeric sealant complying with Division 7 Section "Joint Sealers" to provide a watertight installation.

3.08 ADJUSTING AND CLEANING

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touch-up of field painted surfaces.

1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 05 55 00
MISCELLANEOUS METALS

PART 1 - GENERAL

A. Requirements of Division 1 apply to this Section.

1.1 WORK INCLUDED

A. Shapes, sleeves, anchors, connectors, plates, backing plates, supports, and fastenings required but which are not specified in other Sections.

B. Pipe guards.

C. Wrought Iron Fence and Gates.

D. Other metal fabrications indicated.

1.2 RELATED WORK SPECIFIED ELSEWHERE AS REQUIRED

A. Setting of items to be embedded in concrete.

1.3 GENERAL REQUIREMENTS:

A. Field conditions: Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces. Report all conditions which prevent proper execution of this work.

B. Shop Drawings: Submit in accordance with Section 01340 showing incomplete detail all information required for fabrication, finishing and installation of this work.

C. Codes: Materials and work shall conform to the governing Building Code. In case of conflict between these specifications and the Building Code, the more stringent shall govern.

D. General: Examine all drawings and specifications and include all miscellaneous metal that is not required to be furnished by another trade. Provide all connections, anchors, bolts, and other fastenings as required. Do all cutting, punching, drilling and tapping required for proper assembly of the work.

E. Delivery: Insure that items to be set in concrete are delivered at the proper time.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Steel shapes: Conform to ASTM A36.

B. Structural pipe columns: Conform to ASTM A53, Grade B.

C. Pipe for railings: Conform to ASTM A53 or Al20.

D. Cast iron: Conform to ASTM A48, soft gray iron.

E. Malleable iron castings: Conform to ASTM A47.

F. Welding rods: Conform to requirements of AWS for intended use.

G. Galvanizing: Conform to ASTM A123.

H. Bolts, nuts, screws: Conform to ASTM A307, Grade A.

I. Steel plate: Conform to ASTM A283, Grade A.

J. Steel tubing: Conform to ASTM A501 or A500.

K. Bars, flats, rounds: Conform to ASTM A36, standard grade mild steel.

L. Primer: Conforming to FS-TT-P-86, Type I.

M. Touch-up for galvanized surfaces: All State #321 Galvanizing Powder (30% tin, 30% zinc, 40% lead and flux), "Galvalloy", "Galvover", or approved equal.

N. Miscellaneous material: As indicated or specified.

2.2 SHOP PRIME COAT:

A. Ferrous metal: Properly clean and prepare for painting in compliance with the paint manufacturer's instructions and apply one shop coat of material of the type specified. Thoroughly and completely cover all exposed surfaces as well as surfaces concealed after assembly. Apply paint by brush or spray gun, as best adapted to the paint material and surface conditions. Allow paint to become dry and hard before handling.

1. Apply primer to 2 mil minimum dry coat thickness and touch up after installation and leave in proper condition to receive finish coats.

2.3 GALVANIZING:

A. Galvanize all items to be exposed on the exterior and those interior items so specified. Use the hot dip process, conforming to ASTM A123.

B. Average weight of zinc coating per square foot of actual surface: Not less than 2.0 ounces, with no individual specimen showing less than 1.8 ounces. (One oz. of zinc corresponds to a coating thickness of 0.0017".)

2.4 FABRICATION:

A. Using skilled mechanics, form and fabricate items of work as indicated and as required to meet installation conditions. Make provisions to connect with or receive the work of other trades.

B. Unless otherwise indicated, weld or bolt connections between members. Where possible, conceal connections in the finished work. Where exposed screw fastenings are required, use Phillips ovalhead screws to match parent material. Fit or miter exposed joints to hairline tolerance or use welded joints. On finished surfaces, grind all welds smooth and flush with base metal.

C. Bend pipe or tubing without collapsing or deforming the walls, and so as to provide a smooth uniform curved section and maintain uniform sectional shape.

D. Where items are to be embedded in concrete, provide welded-on anchors or lugs as indicated or required.

PART 3 - EXECUTION

3.1 ITEMS EMBEDDED IN CONCRETE OR MASONRY:

A. Provide bolts, eyebolts, dowels, anchors, plates, inserts, and other miscellaneous items that are to be installed in forms before concrete pouring, or for building into masonry, as indicated. Examine and check the drawings for the number, type and location of such items.

3.2 INSTALLATION:

A. Install all items plumb, level and square, securely and rigidly attached to supporting construction and as detailed.

3.3 DESCRIPTION OF ITEMS:

A. Those items which are of standard or stock design or which are sufficiently detailed or described on the drawings to permit their fabrication and installation, are not covered herein even though they may be included in the Scope.

B. Backing plates in connection with studs and furring necessary for engaging and fastening of stair rail brackets, lavatories and fixtures, etc., shall be provided in locations indicated, or as necessary. Securely fasten backing plates to studs supporting members in required position. Dap into wood studs. Weld between steel studs. Finish with rust inhibitive prime coat.

C. Pipe handrails (if shown): Fabricate from 1 1/4" standard steel pipe to shapes and dimensions indicated. Make joints flush with concealed seamless fittings. Accurately cut, miter, weld and grind smooth to flush surfaces. Make bends to preserve the contour of the pipe. All railings shall meet all disabled access requirements. Install as follows:

1. To masonry walls: Provide cast brackets providing 1 1/2" min. or indicated clearance between railing and wall. Secure to wall with screws into expansion shields.

2. To stud walls: Provide cast brackets providing 1 1/2" min. or indicated clearance between railing and wall. Provide proper backing at studs at proper locations before application of gypsum board. Provide collar, flush metal filler, and secure to backing.

D. Pipe guards and bollards: standard steel pipe as shown. Galvanized after fabricated.

E. Wrought Iron Fence and Gates: Fabricate from wrought steel square tubes as shown and to match existing. Provide all necessary operating hardware for the gates. Reinstall salvaged fence and gates as required. Fence and gates to be hot dip galvanized. Provide factory applied architectural coating over hot-dip galvanized steel “Colorgalv” by Duncan Galvanizing. Primer coat shall be factory applied prime coating. Apply primer within 12 hours after galvanizing at the same facility where the galvanizing is done. Finish coat shall be factory-applied high performance architectural finish. Apply finish coating at the galvanizer’s plant, in a controlled environment as recommended by the finish coating manufacturer. Color to match existing steel fencing to remain at campus. Submit two 3

inch by 6 inch samples of factory applied coatings and colors proposed for use for approval prior to coating application. Provide 20 year warranty against rust.

F. Other miscellaneous metal work as indicated.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Supply and install Rough Carpentry work as indicated.

1.02 RELATED SECTIONS

A. Section 01 43 00: Quality Control.

B. Section 01 45 29: Testing and Inspection.

C. Section 03 30 00: Cast-In-Place Concrete.

D. Section 06 20 00: Finish Carpentry.

E. Section 09 29 00: Gypsum Board.

1.03 SUBMITTALS

A. Submittals: Submit in accordance with Section 01 33 00.

1.04 QUALITY ASSURANCE

A. All work shall be performed in accordance with the local codes and the most current DSA requirements. Where there is a question between the specifications, Architect/Contractor shall conform to the most constrictive requirement.

B. Douglas fir, larch or hemlock structural and framing lumber shall be graded in accordance with the "Standard Grading Rules" of the West Coast Lumber Inspection Bureau (WCLIB) or the "Western Lumber Grading Rules" of the Western Wood Products Association (WWPA) latest editions.

C. Redwood structural and framing lumber shall be graded in accordance with "Standard Specifications for Grades of California Redwood Lumber" of the Redwood Inspection Service, latest edition.

D. Each piece of lumber shall bear official grade mark of the association under whose rules it was graded, or official grade mark of another recognized grading agency using grading rules herein specified.

E. All 2x structural and framing members shall be air-dried to a moisture content not to exceed 19% before use.

F. Work of this Section shall comply with provisions of current edition of UBC and Title 24, see Section 01 45 29: Testing and Inspection.

G. Plywood shall conform to requirements of "Product Standard PS 1 issued by the U.S. Department of Commerce, and shall be grade marked by a recognized grading agency (APA and PTL).

H. Each piece of preservative treated lumber shall be identified by the Quality Mark of an approved inspection agency in accordance with Title 24, see Section 01 45 29: Testing and Inspection.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Lumber: Structural and framing lumber shall be of the following species and grades unless noted otherwise on the drawings:

	USE	SPECIES	GRADE
1.	Subfloor, wall sheathing, roof sheathing and ceiling stripping.	Douglas Fir	"Construction" Board, Structural #1 only WCLIB; WWPA
2.	Beams, girders and truss members (5" and thicker, rectangular, width more than 2" greater than thickness) where exposed as finish members.	Douglas Fir WWPA	Select Structural
3.	Joists, rafters, lintels, posts, mullions and members(2” to 4” thick, 2” to 4” wide)	Douglas Fir	“Structural No. 1 Structural Light Framing, WCLIB;
4.	Other lumber (2" to 4" thick, 2" to 4" wide) not specified in subparagraph 5 above.	Douglas Fir	"Structural No. 1" and Framing WCLIB; WWPA
5.	Framing lumber (2" to 4" thick, 5" and wider).	Douglas Fir	"No. 1" and better Joists and Planks, WCLIB; WWPA.
6.	Mudsills and plates in contact with soil. treated	Douglas Fir	Same as subparagraphs 5 and 6.
7.	Sills or plates resting on concrete or masonry surfaces 6" or less above soil or finish grade.	Douglas Fir treated	Same as subparagraphs 5 and 6.
8.	Sills, foundations plates & sleepers which rest on concrete, masonry foundations, or are laid on concrete on concrete slab in direct contact with soil.	Douglas Fir treated	Same as subparagraphs 4 and 5.
9.	Miscellaneous nailing strips and blocks embedded in concrete or masonry.	Douglas Fir treated	Same as subparagraphs 4 and 5.

B. Plywood: Plywood used for structural purposes, shall be APA grade Structural I plywood. Other plywood used for non-structural purposes shall be exterior type, or Exposure 1.

C. Preservative Treated Wood:

1. Wood and plywood specified as treated wood shall be pressure treated wood in accordance with CBC 2303.1.8."

2. Seasoning: Treated lumber shall be air seasoned after treatment, for a minimum of 2 weeks before use.

3. Creosote shall not be used for treating wood in contact with painted or plastered surfaces.

4. When treated wood member has been notched, dapped, drilled or in any way cut into, such newly cut surfaces shall be painted with a heavy coat of same preservative material used in treatment of wood member.

D. Fire Retardant Protection: Wood and plywood specified as "Fire Retardant Protected Wood" shall be treated by approved methods and materials, and shall be dried, following treatment, to a maximum moisture content as follows: Solid sawn lumber 2" in thickness or less to 19%; and plywood to 15%.

E. Plywood subflooring shall be "Underlayment", Group 1, Exposure 1; of thickness indicated.

F. Mineral Fiber Panels: Shall be asbestos free, thickness as indicated.

G. Reused Materials: Sound lumber and timber which has been used for formwork may not be reused for stress carrying or non-stress carrying members. May not be used in any construction other than formwork.

PART 3 – EXECUTION

3.01 FASTENINGS

A. Nails and Spikes:

1. Use only common wire nails or spikes.

2. Whenever necessary to prevent splitting, holes shall be prebored for nails and spikes.

3. Nails in plywood shall not be overdriven.

4. Machine Applied Nailing: Use of machine nailing is subject to a satisfactory jobsite demonstration for each project and approval by the Project Architect or Structural Engineer and the Division of the State Architect Field Representative. Approval is subject to continued satisfactory performance. Machine nailing will not be approved in 5/16" plywood. If nailheads penetrate outerply more than would be normal for a hand hammer or if minimum allowable edge distances are not maintained, performance will be deemed unsatisfactory and material may be scrapped.

B. Lag Screws:

1. When placing lag screws in a wood member, prebore lead hole as recommended in CBC Title 24 Sec 23.

2. Lag screws which bear on wood shall be fitted with standard steel plate washers under head. Lag screws shall be screwed and not driven into place.

3. Lag screws applied in moisture rich environments or “wet” timber shall be galvanized to prevent degradation of both the lag screw and the material.

C. Bolts:

1. Lumber and timber to be fastened together with bolts shall be clamped together and holes for bolts bored true to line.

2. Bolts shall be fitted with steel plates or standard cut washers under heads and nuts. Bolts shall be tightened when installed and again just before completion of work.

3. Bolts applied in moisture rich environments or “wet” timber shall be galvanized to prevent degredation of both the bolt and the material.

D. Wood Screws: When placing wood screws, lead holes shall be prebored as recommended in CBC Title 24. Wood screws shall be appropriately selected for the application and treated as necessary to prevent corrosion

E. Framing Anchors: Framing anchors, joist hangers, ties and other mechanical fastenings shall be galvanized or have a rust-inhibitive coating. Nails and fastenings shall be of type recommended by manufacturer.

3.02 ERECTION

A. Stud Walls, Partitions and Furring:

1. Wood stud walls, partitions and vertical furring shall be constructed of members of size and spacing indicated. Provide single plate at bottom and double plate at top unless otherwise indicated. Interior, nonbearing non-shear partitions may be capped with a single top plate, installed to provide overlapping at corners and at intersections with other wall and partitions or by metal ties as detailed.

2. Walls and partitions shall have horizontal staggered blocking not less than 2" nominal thickness and same width as studs, fitted snugly, and nailed into studs. Blocking shall be at mid-height of partition or not more than 7'-0" on center vertically. Install wood backing on top of top plate wherever necessary for nailing of lath or gypsum board.

3. Walls, partitions and furred spaces shall have 2" nominal thickness wood firestops, same width as space to be firestopped, at ceiling line, mid-height of partition and at floor line. Firestops at floor line are not required when floor is concrete. If width of opening is such that more than one piece of lumber is necessary, provide 2 thicknesses of 1" nominal material laid with staggered joints.

4. Firestops shall be placed in all stud walls and partitions, including furred spaces, so that maximum dimension of any concealed space is not over 10'-0".

5. Corners, and where wood stud walls and wood vertical furring meet, shall be formed of triple studs. Openings in stud walls and partitions shall have headers as indicated and a minimum of 2 studs at jambs, one stud of which may be cut to support header in bearing.

6. Where wood masonry or concrete walls intersect, end stud shall be fastened at top, bottom and midheight with one 1/2" diameter bolt through stud and embedded in masonry or concrete a minimum of 4". Bolts shall have washers under nuts.

7. Sills under bearing, exterior or shear walls shall be bolted to concrete with 5/8" rd. by 12" long bolts spaced not more than 4'-0" on center. There shall be a bolt within 9" of each end of each piece of sill. Sills shall be placed and leveled with shims and washers placed and nuts tightened to level bearing after which space between sill and concrete shall be dry packed with cement grout. Non-bearing interior plates may be fastened to concrete with low velocity powder driven fasteners provided Structural Engineer's approval is obtained in writing, prior to use.

B. Beams, Girders and Joists:

1. Ends of wood beams, girders and joists which are 2'-0" or less above finished outside grade and which abut, but do not enter concrete or masonry walls, as well as wood blocking used in connection with ends of those members shall be treated with wood preservative.

2. Where wood beams, girders and joists enter masonry or concrete walls 2'-0" or less above outside wall, metal wall boxes or equivalent moisture barriers shall be provided between wood and masonry or concrete.

C. Furring: Where metal furring is not indicated or specified, provide wood furring at all points indicated and required for concealing conduit, piping, structural framing or other unfinished materials. Wood furring shall be 2x studs of required width. Vertical members contacting concrete or masonry shall be attached as specified for anchoring interior wood stud partitions.

D. Nailing Strips and Plates:

1. Provide wood nailing strips, plates and blocking indicated or required. Nailing strips in connection with metal work shall be bolted to metal. Wood nailing blocks for securing grounds shall be built into concrete, or masonry.

2. Nailing schedule shall comply to Title 24, see Section 01 45 29: Testing and Laboratory Services.

E. Wood Backing: Provide wood backing as indicated and as required to receive plumbing, electrical fixtures and equipment, cabinets, door stop plates and other fixed equipment.

END OF SECTION

SECTION 06 20 00
FINISH CARPENTRY

1.0 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the Contract, including, but not limited to, these major items:
   1. Installation of finish hardware.
   2. All other finish carpentry and millwork indicated or required to complete the work.

1.03 RELATED SECTIONS

A. Section 06 41 00 – Custom Casework.

B. Section 08 71 00 – Door Hardware.

C. Section 09 22 16 – Non-Structural Metal Framing.

D. Section 09 90 00 – Painting.

1.04 GENERAL REQUIREMENTS

A. Shop Drawings: Submit drawings showing in complete detail all information required for fabrication, finishing, and installation of this work.

B. Samples: Submit samples of wood that will receive transparent finish, laminated plastic, accessories and hardware.

C. Reference Specifications: Unless otherwise indicated or specified, all materials, fabrication, and workmanship shall conform to the applicable requirements of the Woodwork Institute of California, “Manual of Millwork”, latest edition, (WI) custom grade work, which is hereby made a part of this Section.

1.05 GRADING

A. Softwood Lumber: Grade and grade-mark in accordance with Rules No. 16 of the West Coast Lumber Inspection Bureau, or WWPA grading Rules for Western Lumber, latest edition. Grade-mark shall bear the symbol of an approved grading agency.

B. Other Lumber and Plywood: Conform to the current grading rules of the associations which have jurisdiction over the various lumber species.

C. Grade-mark and mill identification of the association having jurisdiction shall appear on each piece of softwood lumber when delivered to the site.

D. Perform grading of hardwood and plywood, except as otherwise specified, in accordance with rules as noted. Identify each delivery of such material to the site with a certificate of grading issued by the association or member manufacturer. In the absence of specific association bureaus for a species, govern grading as follows:

   1. Hardwood Lumber: National Hardwood Lumber Association.
   2. Plywood: United States Product Standard PS 1-07.
   3.

1.06 DRYING AND STORAGE

A. Kiln drying or equivalent air drying is required for all lumber used for finish. Test of lumber upon delivery to the site shall show a moisture content of not to exceed 12 percent by weight.

B. Store lumber and millwork on wood sills, within enclosed portions of the building, locations, approved by the Architect, and only where not subjected to moisture.

2.00 PRODUCTS

2.01 MATERIALS

A. Trim: All exposed finish wood trim not otherwise identified: VGDF, clear and free of defects. Where opaque finish is indicated, finger joints are acceptable.

B. Plywood: PS 1-07, flat or mixed grain, face grades as specified for particular use.

C. Hardwood solid stock and plywood for transparent finish: As specified for particular use.

D. Waterproof Glue: Polyvinyl acetate emulsion with 55 percent solids, Wilhold by Acorn Adhesives, Weldwood by U.S. Plywood, or approved equal.

E. Exposed Nails: Finish or casing nails.

F. Anchors:
   1. Concrete-Buildex Tapcon 1/4 inch x 1-1/2 inches minimum embedment.
   2. Metal: Buildex Teks 10-14 x 1-1/2 inches.

3.00 EXECUTION

3.01 FINISH CARPENTRY INSTALLATION

A. Perform work under constant supervision of competent foreman, who shall carefully lay out work as required to carry out intent of the drawings, and to properly accommodate the work of other trades. Accurately sawcut and fit lumber into the respective locations, true to line, grade, and level, as indicated or required, and permanently secure in proper position with spikes, nailings, lag screws, bolts, or other fastenings and fittings as detailed, herein specified, or as directed, substantial and rigid in all parts and connections.

B. Finish Woodwork: As a minimum requirement, comply with standards for custom grade work of the WI. Smoothly dress and belt sand finish woodwork at the mill; hand-sand prior to erection. Finish free from open joints, hammer and machine marks, structural defects, and surface blemishes. Wherever practicable, conceal means of fastening various parts and members together. Where surface nailing is unavoidable, neatly set nails for putty stopping. Perform all work by skilled mechanics, true to detail, with all arises in finished work slightly rounded by sanding. Use longest practicable lengths. Miter all joints-butt joints are prohibited.

C. Fitting of moving units shall provide uniform minimum clearance suitable for permanent operation and make proper allowance for paint. Tightly scribe, cut and fit wood trim and millwork against abutting surfaces. Blind nail wood finish where possible. Set all nails for putty.

3.02 INSTALLATION OF DOORS AND HARDWARE

A. Surface-Mounted Hardware: Drill pilot holes for all screws. Accurately and neatly make holes from templates or from the finished Hardware Schedule. Fire doors require self-tapping, full thread, sheet metal screws.

B. Fit hardware to fully conform to standard procedures and to manufacturer's directions. Position of hardware, see Section 08 71 00.

Top butt	5 inches below top of door
Bottom butt	10 inches above finish door
Center butt	Midway between top and bottom butt

C. Preparation for Painting: Removed all finish items (except butts), including finish hardware previously installed on metal doors, which is not otherwise protected. Reinstall after painting is complete.

D. Key File: Lay out a key file for the systematic filing of all keys within the room where the hardware is stored. Promptly tag and file all keys as the lock sets are installed. On completion of the work, including final corrections and adjustments of finish hardware, deliver all keys and master keys complete to the Owner.

END OF SECTION

SECTION 06 41 00
CUSTOM CASEWORK

1.00 GENERAL

1.01 SECTION INCLUDES

A. Special fabricated cabinet units.

B. Countertops.

C. Cabinet hardware.

1.02 REFERENCES

A. ANSI A135.4 – Basic Hardboard.

B. ANSI A208.1 – Mat Formed Wood Particleboard.

C. AWI (Architectural Woodwork Institute) – Quality Standards.

D. BHMA A156.9 – Cabinet Hardware.

E. FS MMM-A-130 – Adhesive, Contact.

F. HPMA (Hardwood Plywood Manufacturer's Association) HP – American Standard for Hardwood and Decorative Plywood.

G. NEMA (National Electric Manufacturers Association) LD3 – High Pressure Decorative Laminates.

H. NHLA (National Hardwood Lumber Association).

I. PS 1 –Construction and Industrial Plywood.

J. PS 20 – American Softwood Lumber Standard.

K. WI (Woodwork Institute of California) – Manual of Millwork.

1.03 SUBMITTALS FOR REVIEW

A. Shop drawings shall indicate list of material and hardware, sized, sections, elevations, and details of construction and assembly as required by Section 1 "Millwork Shop Drawings of the May, 1955 edition Woodwork Institute of California, Manual of Millwork.

"

1.04 QUALITY ASSURANCE

A. Perform work in accordance with WI Custom quality and obtain certification unless noted otherwise in the Contract Documents.

2.00 PRODUCTS

2.01 TYPE AND MANUFACTURE

A. Cabinets shall be manufactured in accordance with WI Manual of Millwork, Section 15 Custom Grade typical modified as indicated in the drawings and specifications and herein specified. All units shall be factory finished. Provide Style A Frameless, Type I construction unless otherwise noted.

2.02 MATERIALS, FINISH AND CONSTRUCTION

A. Exposed Portions:

1. Material for exposed portions shall be faced with decorative high pressure laminated plastic.

   a. Plastic laminate shall be Standard Grade, Matte finish, thermoplastic laminate surfacing, .050-inch thick, meeting the requirements of NEMA LD 3-85. Backing sheets shall be .020-inch thick conforming to the requirements of NEMA LD, latest edition. Use post forming grade where required by the drawing details, minimum thickness .042 inch +/- .004 inch.

   b. Color and pattern as selected by Architect. Accepted manufacturers include Laminate, Formica, and Wilson Art Architect reserves the right to select more than one color and pattern from more than one manufacturer for use on any one cabinet. Architect may select colors from any of the listed manufacturers.

B. Semi-Exposed Portions:

1. Material for semi-exposed portions, except interior faces of hinged doors, shall be high pressure laminate cabinet liner meeting the requirements of NEMA LD-3-85.

2. The interior faces of hinged doors shall be faced with 0.032-inch minimum thickness high pressure laminate plastic conforming to NEMA LD-3.

C. Concealed Portions:

1. Material for concealed portions may be sound, dry solid stock, plywood or particleboard, except where otherwise specified herein.

2. Prime unfinished surfaces with primer coat or sealer.

D. Visible Edges: All visible edges, exposed or semi-exposed, of ends, tops, bottoms, shelves (4 sides/edges), webs, stretchers, divisions, doors and drawer fronts shall be edged with melamine decorative paper tape matching adjacent color.

E. Laminate Core Material shall be particleboard meeting the requirements of ANSI A 208.1-87, Table 1, Grade 1-M-3.

F. Adhesive shall be Type II, water resistant.

2.03 TOPS AND BOTTOMS

A. Tops and bottoms shall be particleboard or plywood with 0.050” high pressure laminated plastic on exposed portions or cabinet liner on semi-exposed portions, net thickness shall be 0.735 inch.

B. Plywood bottoms of upper cabinets with spans 4’0 inches or over in length between vertical members of the cabinet body shall be a minimum of 1 inch in thickness.

2.04 ENDS AND DIVISIONS

A. Cabinet ends and divisions shall be particleboard or plywood as detailed in the Drawings with 0.050” thick high pressure laminated plastic on exposed faces or high pressure laminate cabinet liner on semi-exposed portions, net thickness shall be .0735 inch. Visible edges shall be .050” high pressure laminated plastic.

B. Cabinet ends shall be lockjointed, securely glued, and blind nailed or screwed to the tops, web frames, and bottoms at not to exceed 4” on center. Doweled construction is acceptable.

2.05 WEB FRAMES AND STRETCHERS

A. Web frames and stretchers shall be a minimum of 0.735 inch in thickness and 2-1/2 inches in width, and shall be solid stock or plywood. A solid piece of plywood or particleboard a minimum of 0.735 inch in thickness, the full length and depth of the cabinet opening, may be used in lieu of a web frame or stretchers.

B. Web frames shall be furnished under countertops; or a continuous stretcher front and rear may be furnished in lieu of the frame, and shall be attached by means of a dado, tenon or metal angle bracket. A continuous stretcher at the front shall be furnished at the approximate mid-height of all drawer cabinets over 2 feet-6 inches in drawer opening height and shall be attached by means of a dado, tenon or metal angle bracket.

2.06 BACKS

A. Semi-exposed backs shall be 1/4-inch thick plywood or tempered and sealed hardboard with high pressure laminate cabinet liner. Exposed backs shall be 1/2-inch thick plywood with 0.050 inch high pressure laminated plastic.

B. Color shall match adjacent semi-exposed or exposed portions as applicable.

C. Backs shall be securely nailed, doweled or dadoed to the case body, divisions, or fixed shelves.

2. 07 SHELVES

A. Shelves shall be plywood or particleboard with 0.050 inch thick high pressure laminate cabinet plastic when shelves are exposed and high pressure laminate cabinet liner when shelves are semi-exposed. Minimum net thickness shall be 0.735 inch. Exposed edges shall be bound in .0550 inch thick high pressure laminated plastic.

B. Adjustable shelves with unsupported spans in excess of 3 feet-6 inches between vertical members of the case body for plywood, and in excess of 3 feet-0 inches for particle board, shall be minimum of 1-inch thickness; and, shall be mounted on surface or recessed metal shelf standards with clips adjustable at 1/2-inch center.

2.08 CABINET BASES AND SLEEPERS

A. Cabinet bases may be constructed with either separate or integral bases. All bases and sleepers shall be 0.735 inch solid stock or as indicated in drawings if more stringent. Sleepers shall be provided at a maximum of 3 feet-0 inches on center.

2.09 ANCHOR STRIPS

A. Anchor strips or solid stock or plywood shall be a minimum of 1/2 inch in thickness and a minimum of 2-1/2 inches in width, and shall be provided at the wallside of the cabinet back on both top and bottom of wall hung cabinets and at top only of base cabinets unless otherwise shown on the Drawings.

2.10 COUNTERTOPS

A. LG Hausys, Hi-Macs engineered stone countertops.
   1. 90-93 percent hard aggregates (quartz granite or mirror) boded with7-10% resins and environmentally safe, color fast pigments.
   2. 3/4-inch Thickness.
   3. 2-1/4 inches Bullnose edge.
   4. 4 inches High square butt backsplash with 1/4 inch beveled top edge.

5. Polished finish.

6. Color as selected by District.

7. Seams in countertop treated in same manner as for granite.

2.11 HARDWARE

A. All hardware shall be jig fitted at the factory by trained craftsman only. Provide U.S. 26D Dull Chrome finish.

1. Hinges – Blum Clip 125# 74M5558 – 3 on doors over 42 inches high; 2 on doors under 42 inches high.

2. Pulls – Shall be U shaped or looped wire pulls (3-3/4 inches long by 1-1/4 inches high by 3/4 inch deep).

3. Catches – Shall be Amerock #T-9798-AW three-plate magnetic catch manufactured by Amerock Corporation, or accepted equal.

4. Elbow Catches – Amerock #3675 on companion doors where locks are specified.

5. Door Locks – National C8102.6 – masterkeyed to other casework.

6. Drawer Locks – National C8108 – maskerkeyed to other casework.

7. Drawer Guides – Shall be Blum 430E series or accepted equal.

8. Shelf Standards –Shall be Knape & Vogt #255 mounted with four Knape & Vogt #237 clips for each shelf, or accepted equal.

9. Grommets – Hafele #429.99; provide at all locations where electrical, computer, telephone, etc. Receptacle are below countertop. Color as selected by Architect.

2.12 FABRICATION - GENERAL

A. All units shall be completely fabricated and finished in the factory, except as otherwise specified or indicated for modified units. All doors and all hardware shall be jig fitted and ready for site installation.

3.00 EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION FOR INSTALLATION

A. Make necessary measurements in the field to assure proper fit of shop fabricated items.

3.03 INSTALLATION

A. Install the work of this Section in accordance with the accepted Shop Drawings and Section 26, WI “Manual of Millwork: using factory trained craftsman.

1. Scribe units to wall, floor, and other surfaces as appropriate, with not more than 1/32 inch clear between the cabinet or fixture and the abutting permanent surface, and with no change of clearance in excess of 0.01 inch in any 4 inches.

2. Set each unit square, level, plumb, and aligned within a tolerance of one on 1000 vertically and horizontally, and within 1/4 inch of the designated location for freestanding work.

B. Upon completion of installation, thoroughly clean each item by use of only such cleaning materials as are recommended by the manufacturer of the item being cleaned.

C. Touch up scratches and abrasions to be completely invisible to the unaided eye from a distance of five feet.

END OF SECTION

SECTION 07 11 20
WATERPROOFING TYPE B

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

A. Principal Work in this Section:

1. Sheet membrane waterproofing at elevator pit and site walls.

2. Primer, adhesives, sealants, mastic, and protection board.

B. Related Work:

1. All other waterproofing.

1.03 SUBMITTALS

A. Submit the following in accordance with the requirements of Section 01340:

1. List of proposed materials and manufacturer's data for each.

2. 12-inch samples of waterproofing membrane and protection board.

3. Large scale details of reinforcement, terminations, and penetrations through waterproofed surfaces.

4. Letter from the manufacturer to verify its acceptance of the applicator and acceptance of substrates as satisfactory to receive this work.

1.04 QUALITY ASSURANCE

A. Applicator's Qualifications: Firm with a minimum of 3 consecutive years of experience in application of the waterproofing proposed for use on projects of similar size and scope.

B. Manufacturer's inspections:

1. Request the manufacturer's presence before start of this work to verify substrate acceptability, and as required thereafter to review installation procedures and completed work, and to issue warranty specified.

2. Unsatisfactory conditions disclosed by the manufacturer's visits to the site shall be promptly and satisfactorily repaired and the areas re-inspected by the manufacturer before work starts or resumes in affected areas.

1.05 HANDLING

A. Comply with the requirements of Section 01600. Store rolled goods on end.

1.06 WARRANTY

A. Warrant waterproofing against faulty materials and workmanship for five (5) years after installation.

B. Make repairs required during the warranty period at no cost to the District.

1.07 JOB CONDITIONS

A. Apply waterproofing materials only in dry weather when the outside temperature is above 40 deg. F.

B. Do not apply waterproofing materials to damp, wet or frost covered surfaces.

2.00 PRODUCTS

2.01 MATERIALS

A. Waterproofing Membrane: One of the following.

1. Bituthene 4000, WR Grace & Co.

2. MEL-ROL, WR Meadows, Inc.

3. Miradri, Mirafi, Inc.

4. Duramem 700-SM, Pecora Corp.

5. Polyguard 650, Polyguard Product, Inc.

6. QSC-701, Carlisle Coatings and Waterproofing.

B. Primer, adhesive, mastic, sealant and other miscellaneous materials required for installation of the membrane: As recommended by the membrane manufacturer.

C. Protection Board: ¼ in. thick APOC Board by Asphalt Products Oil Corp. or equal by WR Meadows, Inc., Celotex Corp., or JP Petroleum Corp.

3.00 EXECUTION

3.01 INSPECTION

A. Inspect surfaces to be waterproofed.

B. Make sure that conditions detrimental to the proper and timely completion of this work are corrected before proceeding with installation.

3.02 PREPARATION

A. Check that areas to be waterproofed are clean and dry. Fill voids and cracks and remove ridges and fins, leaving a smooth, clean surface.

3.03 INSTALLATION

A. Application: In accordance with the membrane manufacturer's printed instructions and the following.

1. Install a **double thickness** of membrane at drains, at penetrations and protrusions, over construction joints and cracks in the substrate, and at **all corners.**

2. Install the membrane with lapped joints, fused or welded to provide a continuous water barrier. Extend membrane to within 2 in. of finish grade where the membrane would be exposed to view.

3. Finish penetrations and terminations as indicated on the approved manufacturer's details.

4. Roll all membranes for complete adhesion to substrate as soon as possible after installation.

5. Seal all membrane edges continuously.

B. Protection:

1. Do not install protection board until the membrane has been inspected, tested when applicable, and approved.

2. Cover the membrane with protection board with tight butt joints.

a. Adhere board to the membrane using adhesive recommended by the membrane manufacturer.

b. Backfill as soon as possible after testing is completed and installation is approved.

3.04 FIELD QUALITY CONTROL

A. After completing installation of waterproofing, and just prior to installation of wearing surface, plug drains and other outlets, dam areas that can not be otherwise partitioned, and fill the entire membrane area with 2 in. of water for 24 hours.

B. Repair leaks and retest the membrane until proven watertight.

END OF SECTION

SECTION 07 17 75
WATER REPELLENT COATING

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

A. Principal Work in this Section:

1. Clear water-repellent coating on exposed surfaces of concrete masonry units, cast-in-place concrete walls and caps.

B. Related Work:

1. Painting: Section 09 90 00.

1.03 SUBMITTALS

A. Procedure: In compliance with Section 01 34 00.

B. Manufacturer's Data: Submit data of the proposed coating, including recommended coverage rates.

C. Samples: Submit samples of water-repellent coating applied to brick samples which will be furnished by the Architect.

D. Coating Manufacturer:

1. When requested, provide the coating manufacturer with sufficient samples of the substrate to be coated to determine exact formulation and coverage rates.

2. Submit letter from the coating manufacturer to verify its acceptance of the applicator and acceptance of substrates as satisfactory to receive water-repellent coating.

3. Submit duplicate copies of manufacturer's affidavit with each shipment of materials delivered to the jobsite certifying that material furnished complies with specified requirements.

1.04 QUALITY ASSURANCE

A. Applicator's Qualifications: Firm with a minimum of 3 consecutive years of experience in application of the coating proposed for use on projects of similar size and scope, and licensed or approved in writing by the coating manufacturer.

B. Manufacturer's Inspections: Obtain materials only from manufacturers who will send a qualified technical representative to the Project site for the following.

1. Before start of this work to verify substrate acceptability, and as required thereafter to review installation procedures and completed work, and to issue warranty specified.

2. Unsatisfactory conditions disclosed by the manufacturer's visits to the site shall be promptly and satisfactorily repaired and the areas reinspected by the manufacturer before work starts or resumes in affected areas.

C. Sample Panel:

1. Apply water-repellent coating to one side of the sample panel specified in Section 04 21 00; identify the coated side.

2. Do not proceed with application at the site until the Architect's approval of the coated sample panel is obtained.

D. Performance criteria: Coating selected shall meet the criteria specified below and shall show no through water penetration when tested in compliance with ASTM E 514 at a test pressure equal to that prescribed in Chapter 16 of the UBC for the wall height and location, but not less than 10 psf.

1.05 JOB CONDITIONS

A. Comply with manufacturer's recommendations regarding environmental requirements, and temperature and conditions of surfaces to receive coating.

1.06 WARRANTY

A. Warrant coating against water penetration through treated surfaces, peeling, cracking, discoloration and other defects of the coating, caused by faulty materials and workmanship, for 5 years after Substantial Completion.

B. The warranty shall include repair of any defects and failures in the coating during the warranty period, at no additional cost to the District.

2.00 PRODUCTS

2.01 COATING / MANUFACTURER

A. Manufacturers:

1. Hydrozo, Inc.

2. Huls American, Inc.

3. Nox-Crete Chemicals.

4. ProSoCo Inc.

B. The manufacturers listed above make acceptable products for use on the Project. The Contractor shall, with the selected product manufacturer's cooperation, select the appropriate coating for the substrate which meets the criteria specified herein and will perform as specified within the warranty period.

C. The coating shall be invisible after application and shall not change the color and sheen of the coated substrate.

3.00 EXECUTION

3.01 INSPECTION / PREPARATION

A. Verify that surfaces to be coated are clean, dry and free of dust, dirt, oil, grease, and other foreign material which would affect the application and performance of the coating.

B. Make sure that unsuitable conditions which would prevent proper and timely completion, and performance of this work are corrected before starting with application.

3.02 PROTECTION

A. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of water repellent.

B. Cover adjoining and nearby surfaces where there is possibility of water-repellent being deposited on these surfaces.

C. Clean water-repellent coating from adjoining and nearby surfaces immediately after spillage. Comply with manufacturer's recommendations for cleaning.

3.03 APPLICATION

A. Where feasible delay application of water-repellent coatings until installation of sealants has been completed in joints adjoining surfaces to be coated with water-repellent.

B. Apply by manufacturer approved applicators using recommended methods and equipment. Do no exceed the application rate recommended by the manufacturer.

3.04 FIELD QUALITY CONTROL

A. The District may employ a testing agency to test the inplace walls in compliance with ASTM E 514.

B. Cost of test will be paid by the District, except that should the test disclose that the wall tested does not comply with these Specifications, the cost of the test and subsequent retests shall be paid by the Contractor.

C. In the event test show that the wall(s) is deficient, apply additional water-repellent and repeat of the above referenced procedure on all remaining previously treated surfaces will be at the Contractor's expense.

END OF SECTION

SECTION 07 19 50
UNDER SLAB VAPOR RETARDER

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Products Supplied Under this Section:

1. Vapor retarder and installation accessories for installation under concrete slabs.

B. Related Sections::

1. Cast-in-Place Concrete: Section 03 30 00.

1.03 REFERENCES

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

1. ASTM E 1745- 11 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

2. ASTM E1643- 11 Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. Technical Reference – American Concrete Institute (ACI):

1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

2. ACI 302.1R-15 Guide to Concrete Floor and Slab Construction.

1.04 SUBMITTALS

A. Quality Control / Assurance:

1. Summary of test results per Paragraph 9.3 of ASTM E 1745.

2. Manufacturer's samples and literature.

3. Manufacturer's installation instructions for placement, seaming, penetration prevention and repair, and perimeter seal per ASTM E 1643.

4. All mandatory ASTM E 1745 testing must be performed on a single production roll per ASTM E 1745 Section 8.1.

2.00 PRODUCTS

2.01 MATERIALS

A. Vapor retarder shall have all of the following qualities:

1. Maintain permeance of less than 0.03 Perms (grains/(ft^2 hr inHg)] as tested in accordance with mandatory conditioning tests per ASTM E 1745 Section 7.1 (7.1.1-7.1.5).

2. Other performance criteria:

   a. Strength: ASTM E 1745, Class A.

   b. Thickness: 10 mils minimum.

3. Provide third party documentation that all testing was performed on a single production roll per ASTM E 1745 Section 8.1.

B. Vapor Retarder Products:

1. Basis of Design: Stego Wrap Class A Vapor Retarder by Stego Industries LLC., (877) 464-7834 www.stegoindustries.com.

2.02 ACCESSORIES

A. Seams:

1. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

B. Sealing Penetrations of Vapor Retarder:

1. Stego Mastic by Stego Indusries LLC, (877) 464-7834 www.stegoindustries.com.

2. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

C. Perimeter / Edge Seal:

1. Stego Crete Claw by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

2. Stego Term Bar by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

3. Stego Tack Tape (double-sided sealant tape) by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

D. Penetration Prevention:

1. Beast Foot by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

E. Vapor Barrier-Safe Screed System:

1. Beast Screed by Stego Industries, LLC, (877) 464-7834 www.stegoindustries.com.

3.00 EXECUTION

3.01 PREPARATION

A. Ensure that subsoil is approved by Architect or Geotechnical Engineer.

1. Level and compact base material.

3.02 INSTALLATION

A. Install vapor retarder in accordance ASTM E 1643.

1. Unroll vapor retarder with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.

2. Extend vapor retarder to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor retarder. At the point of termination, seal vapor retarder to the foundation wall, grade beam or slab itself.

   a. Seal vapor retarder to the entire perimeter wall or footing / grade beam with double-sided Stego Tack Tape, or both Stego Term Bar and Stego Tack Tape, per manufacturer's instructions. Ensure the concrete is clean and dry prior to adhering tape.

3. Overlap joints 6 inches and seal with manufacturer's seam tape.

4. Apply seam tape / Crete Claw to a clean and dry vapor retarder.

5. Seal all penetrations (including pipes) per manufacturer's instructions.

6. For interior forming applications, avoid the use of non-permanent stakes driven through vapor retarder. Use blunt-end and/or threaded nail stakes (screed pad posts) and insert them into Beast Foot. Ensure Beast Foot's peel-and-stick adhesive base is fully adhered to the vapor retarder.

7. If non-permanent stakes must be driven through vapor retarder, repair as recommended by vapor retarder manufacturer.

8. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the vapor retarder.

9. Repair damaged areas with vapor retarder material of similar (or better) permeance, puncture and tensile.

10. For vapor barrier-safe concrete screeding applications, install Beast Screed (vapor barrier-safe screed system) per manufacturer's instructions prior to placing concrete.

END OF SECTION

SECTION 07 21 00
BUILDING INSULATION

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Principal Work in this Section:

1. Thermal insulation at following locations unless otherwise indicated or specified:

a. In the ceilings and roofs of air-conditioned spaces.

b. Exterior CMU and wood stud walls.

c. Rigid insulation at built roof slopes.

2. Acoustical insulation in all interior stud walls.

3. Supplementary parts and components, such as clips, fasteners, supplementary framing, and other miscellaneous accessories required for a complete installation.

B. Related Work:

1. Pipe and Duct Insulation, see mechanical and plumbing drawings.

2. Rigid Insulation at Single-Ply Roof: Reference Section 07 54 23 – Single-Ply Roofing.

1.03 SUBMITTALS

A. Procedure: Comply with Section 01340.

B. Data: Manufacturer's data for materials specified below.

1.04 HANDLING

A. Procedure: Comply with Section 01600.

B. Storage: Store insulation under cover, protected from moisture and off the ground or floor. Remove insulation that becomes wet or damp immediately from the job site.

2.00 PRODUCTS

2.01 MATERIALS

A. Thermal Insulation: Insulation shall have a minimum "R" value of 30 in attic space below roof deck and "R" value of 19 in exterior metal stud walls. Provide wire support below roof deck as required.

1. Glass fiber or mineral wool batt or blanket insulation complying with ASTM C 665, Type III, Class A, flame spread 25 or less, by Schuller International, Inc., US Gypsum Co., Partek Insulations, Inc., CertainTeed Corp., Knauf, or Owens-Corning Fiberglas Corp. Flame spread 25, smoke development 50.

B. Rigid Insulation: GAF Energy Guard Ultra Polyiso Insulation 4 inches thickness, “R” Value 23.6.

C. Acoustical Insulation: Fiberglass Sound Attenuation Blankets by Owens Corning Co., Pyro-Fiber Sound Control Blankets by Schuller International, Inc., SAB Insulation by Partek Insulation, Inc., or FBX Sound Control Fire Blanket by Fibrex, of the thickness indicated. 3-1/2 inches thick, flame spread 10, smoke development 10, typical at all interior metal stud walls.

C. Miscellaneous Materials:

1. Staples, zinc-coated wires and other devices for fastening insulation: As recommended by the insulation manufacturer.

2. Insulation Tape: “FSK Copolymer” by Compac Corp. (800) 631-9347, General Purpose FSK Facing Tape by Venture Tape (800) 343-1076, or equal FSK-faced cold weather tape a minimum of 2 in. wide.

3. Roof insulation shall be supported by 19-gage wire, 2’0” O.C., at right angle to direction of roof joists if applicable, at underside of roof deck.

3.00 EXECUTION

3.01 INSPECTION / PREPARATION

A. Verify conditions and measurements affecting the work of this Section at site. Make sure that detrimental conditions are corrected before proceeding with installation.

B. Before installing insulation in stud walls, thoroughly clean sill plate of debris.

3.02 INSTALLATION

A. Install insulation where shown and specified. Cut to fit irregular spaces, butt edges into firm contact with each other and adjoining surfaces.

1. Hand pack around pipes, ducts, conduits, electrical boxes, and other penetrations as required to thoroughly fill all voids and spaces between framing members and to form a continuous thermal or acoustical barrier.

2. Do not compress insulation more than 10%.

3. Where door and window frames occur in insulated assemblies, cut additional strips of insulation and handpack to fill all voids in and around the frames.

4. Comply with the California Electrical Code (CEC) for installation in proximity to light fixtures. Do not install insulation closer than recommended by CEC.

5. Install foil-faced insulation with foil facing the building interior.

B. In stud walls more than 8 ft. high, and where the insulation is not self-supporting, attach acoustical insulation to gypsum board using staples with divergent points placed at each corner and at 24 in. o.c. thereafter.

C. After installation is complete, tape penetrations and ruptures in vapor barrier at ceiling or roof insulation, and tape joints between batts continuously.

D. In staggered stud partitions, install insulation horizontally and weave through the studs.

3.03 FIELD QUALITY CONTROL

A. Prior to closing-in of insulated assemblies, or prior to Substantial Completion for insulation that will remain exposed in the building, refit, reinstall and/or replace wet, damaged and displaced insulation.

END OF SECTION

SECTION 07 25 00
WEATHER BARRIERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Weather barrier membrane DuPont™ Tyvek® CommercialWrap® and/or DuPont™ Tyvek® CommercialWrap® D

B. Seam Tape DuPont™ Tyvek® Tape 3”

C. Weather barrier membrane Flashing DuPont™ FlexWrap™, DuPont™ StraightFlash™, DuPont™ StraightFlash™ VF, and DuPont™ Thru-Wall Flashing

D. Fasteners

1.2 REFERENCES

A. ASTM International

1. ASTM C 920; Standard Specification for Elastomeric Joint Sealants
2. ASTM C 1193; Standard Guide for Use of Joint Sealants
3. ASTM D 882; Test Method for Tensile Properties of Thin Plastic Sheeting
4. ASTM D 1117; Standard Guide for Evaluating Non-woven Fabrics
5. ASTM E 84; Test Method for Surface Burning Characteristics of Building Materials
6. ASTM E 96; Test Method for Water Vapor Transmission of Materials
7. ASTM E 1677; Specification for Air Retarder Material or System for Framed Building Walls

B. AATCC – American Association of Textile Chemists & Colorists

1. Test Method 127 Water Resistance: Hydrostatic Pressure Test

C. TAPPI

1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
2. Test Method T-460; Air Resistance of Paper (Gurley Hill Method)

1.3 SUBMITTALS

A. Product Data: Submit manufacturer current technical literature for each component.

B. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.

C. Quality Assurance Submittals

1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.

2. Manufacturer Instructions: Provide manufacturer's written installation instructions.

3. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.

D. Closeout Submittals

1. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.4 QUALITY ASSURANCE

A. Qualifications

1. Installer shall have experience with installation of DuPont ™ Tyvek® weather barrier assemblies under similar conditions.

2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.

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

B. Mock-up

1. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.

a. Mock-up size: [10 feet by 10 feet] .

b. Mock-up Substrate: Match wall assembly construction, including window opening.

2. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty.

C. Pre-installation Meeting

1. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Architect, installer, Owner's Representative, and weather barrier manufacturer's designated representative.

2. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.5 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.

B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

1.6 WARRANTY

A. Special Warranty

1. Weather barrier manufacturer's warranty for weather barrier for a period of ten years from date of Substantial Completion.

2. Approval by weather barrier manufacturer for warranty is required prior to assembly installation.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. E.I. du Pont de Nemours and Company ; 4417 Lancaster Pike, Chestnut Run Plaza 721, Wilmington, DE 19805; 1.800.44TYVEK (8-9835); http://construction.tyvek.com

2.2 MATERIALS

A. Basis of Design: High-performance, flash spun-bonded olefin, non-woven, non-perforated, secondary weather barrier is based upon DuPont™ Tyvek® CommercialWrap® D and related assembly components.

B. Performance Characteristics:

1. Air Penetration: Type 1 when tested in accordance with ASTM E 1677.

2. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E 96, Method B.

3. Water Penetration Resistance: 235 cm when tested in accordance with AATCC Test Method 127.

4. Basis Weight: 2.4 oz/yd^2, when tested in accordance with TAPPI Test Method T-410.

5. Air Infiltration Resistance: Air infiltration at >750 seconds, when tested in accordance with TAPPI Test Method T-460.

6. Tensile Strength: 33/41 lbs/in., when tested in accordance with ASTM D 822 , Method A.

7. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84 . Flame Spread: 15, Smoke Developed: 25.

2.3 ACCESSORIES

A. Seam Tape: 3" DuPont™ Tyvek® Tape as manufactured by DuPont.

B. Fasteners:

1. Steel Frame Construction DuPont™ Tyvek® Wrap Cap Screws,: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap fasteners.

C. Sealants

1. Provide sealants that comply with ASTM C 920, elastomeric polymer sealant to maintain watertight conditions.
2. Products:

a. Tremco 830

b. Tremco Butyl

c. DuPont Tyvek Commercial Sealant

D. Adhesives:

1. Provide adhesive recommended by weather barrier manufacturer.

2.

a. Liquid Nails® LN-109

b. Polyglaze® SM 5700

c. Denso Butyl Liquid

d. 3M High Strength 90

e. Loctite 300

f. Adhesives recommend by the weather barrier manufacturer.

E. Primers:

1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.

2. Products:

a. 3M High Strength 90

b. Denso Butyl Spray

c. Loctite 300

d. Permagrip 105

e. Primers recommended by the flashing manufacturer

F. Flashing

1. DuPont™ FlexWrap™: Flexible membrane flashing materials for window openings and penetrations.

2. DuPont™ StraightFlash™: Straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.

3. DuPont™ StraightFlash™ VF: Dual-sided flashing membrane materials for brick mold and non-flanged windows and doors.

4. DuPont™ Thru-Wall Surface Adhered Membrane with Integrated Drip Edge: Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly

5. Preformed Inside and Outside Corners and End Dams as manufactured by DuPont: Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION - WEATHER BARRIER

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations

B. Install weather barrier prior to installation of windows and doors.

C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level

E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.

F. Window and Door Openings: Extend weather barrier completely over openings.

G. Overlap weather barrier

1. Exterior corners: minimum 12 inches.

2. Seams: minimum 6 inches.

H. Weather Barrier Attachment:

1. Steel Frame Construction Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 6 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

I. Apply 4 inch by 7 inch piece of DuPont ™ StraightFlash™ to weather barrier membrane prior to the installation cladding anchors.

3.3 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.

3.4 OPENING PREPARATION for use with non-flanged windows – all cladding types

A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.

B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.5 FLASHING for use with non-flanged windows – all cladding types

DuPont recommends the use of the 7-inch wide FlexWrap™ with 2 by 4 framing and 9-inch wide FlexWrap™ with 2 by 6 framing.

A. Cut DuPont™ FlexWrap™ a minimum of 12 inches longer than width of sill rough opening.

B. Cover horizontal sill by aligning DuPont™ FlexWrap™ 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 DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.

D. Apply 9-inch wide strips of DuPont™ StraightFlash™ at jambs. Align flashing with interior edge of jamb framing. Start StraightFlash™ at head of opening and lap sill flashing down to the sill.

E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.

F. Install DuPont™ FlexWrap™ at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.

G. Coordinate flashing with window installation.

H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.

I. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.

J. Tape top of window in accordance with manufacturer recommendations.

K. 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.

3.6 OPENING PREPARATION for use with flanged windows

A. Cut weather barrier 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 at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.7 FLASHING (for use with flanged windows)

DuPont recommends the use of the 7-inch wide DuPont™ FlexWrap™ with 2 by 4 framing and 9-inch wide FlexWrap™ with 2 by 6 framing.

A. Cut DuPont™ FlexWrap™ a minimum of 12 inches longer than width of sill rough opening.

B. Cover horizontal sill by aligning DuPont™ FlexWrap™ 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 DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.

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.

3.8 FIELD QUALITY CONTROL

A. Notify manufacturer's designated representative to obtain required periodic observations of weather barrier assembly installation.

3.9 PROTECTION

A. Protect installed weather barrier from damage.

END OF SECTION

SECTION 07 41 13
METAL ROOF PANELS 238 T

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES

1. Standing-seam metal roof panels, including trim and accessories

2. Related Sections:

a) Section 06 10 00 – Rough Carpentry.

b) Section 07 62 00 - Sheet Metal Flashing and Trim

c) Section 07 70 00 - Roof Accessories

d) Section 07 90 00 - Joint Sealers

1.2 REFERENCES

A. AISI S-100 – North American Specification for the Design of Cold-Formed Steel Structural Members.

B. ASCE-7: American Society of Civil Engineers -Minimum Design Loads for Buildings and Other Structures; version adopted by local Building Code authority having jurisdiction.

C. ASTM A792 - Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

D. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding System by Uniform Static Air Pressure Difference

E. ASTM E1646 - Standard Test Method for Rate of Water Penetration Through Exterior Metal Roof Panel Systems By Uniform Static Air Pressure Difference.

F. ASTM E1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.

G. ASTM E2140 - Standard Test method for water penetration of metal roof panel systems by static water pressure head.

H. Factory Mutual 4471 Appendix G - Susceptibility to Leakage Test Procedure for Class 1 Panel Roofs.

I. UL 580 - Tests for Uplift Resistance of Roof Assemblies.

J. UL 1897 - Uplift Tests for Roof Covering Systems.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation Meetings:

1. Schedule meeting to discuss roof project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements before start of work onsite.

2. Required attendees: Contractor, metal deck & roof installer, and any other subcontractors who have equipment penetrating the roof or Work that requires roof access or traffic.

1.4 SUBMITTALS

A. Product Data: Manufacturer literature indicating product specifications, installation instructions, and standard construction details for specified products.

B. Shop Drawings: To be prepared by metal roof system manufacturer.

1. Submit roof plan showing panel layout, profiles, components, accessories, finish colors, gutters and downspouts as applicable.

a) Indicate layout of roofing panels and roof panel sizes, including custom fabricated roofing panels if indicated, indicate each trim condition.

b) Include details of each condition of installation, including the locations and types of fasteners, sealants and accessories. Indicate locations, gauges, shapes, and methods of attachment of all panels, accessories and trim.

c) Indicate products/materials required for construction activities of this section not supplied by manufacturer of products of this section.

d) Indicate locations of field applied sealant.

e) Indicate locations of field worked conditions.

2. Roof Panel Attachment:

a) Roof plan with wind uplift pressure calculations at field, corner and perimeter areas according to version of ASCE-7 referenced by locally-adopted Building Code and the authority having jurisdiction.

b) Roof plan indication roof clip spacing pattern at field, corner, perimeters and where panels are to be fixed from thermal movement.

c) Roof panel attachment plan must be stamped by licensed engineer in State in which project is constructed, certifying roof attachment meets local Building Code requirements for wind uplift.

C. Samples:

1. Submit two samples, 12" long, full width panel, showing metal gage, and seam.

2. Two samples each for roof panel clip, bearing plate and clip fastener.

3. Submit color samples for Architect's selection.

4. Submit sample warranties:

   a) Manufacturer Finish Warranty

   b) Manufacturer Weathertightness Warranty complying with this Specification

   c) Installer Warranty

D. Certificates:

1. Submit roof panel manufacturer's certification that fasteners, clips, backup plates, closures, roof panels and finishes meet the specification requirements.

2. Submit roof panel manufacturer’s certification that installer meets requirements to install roof system and is qualified to obtain required warranties.

E. Delegated Design Submittals: Submit engineering calculations indicating wind uplift pressure calculations according to local building code for project location with respect to appropriate Importance Factor, Exposure category and Safety Factor. Calculations shall be sealed by a professional engineer licensed to practice structural engineering in the state in which project is located.

F. Test and Evaluation Reports - Certified test results that indicate roof system meets or exceeds design and performance criteria. Testing to include:

1. Static Water Testing Certification: Manufacturers test data, signed and sealed by a registered professional engineer, in accordance with FM4471 Appendix G, and pass with no leakage. The test specimen must successfully withstand being submerged under 6” of water for a minimum period of 7 days.

2. ASTM E1680 - Manufacturer’s test data, signed and sealed by a registered professional engineer, for air infiltration rates meeting the following:

   a) 16” panel width - 0.0028 cfm/sf maximum at a differential pressure of +/-20 pounds per square foot.

   b) 18” panel width - 0.0025 cfm/sf maximum at a differential pressure of +/-20 pounds per square foot.

   c) 24” panel width - 0.0019 cfm/sf maximum at a differential pressure of +/-20 pounds per square foot.

3. ASTME1646 - Manufacturer’s test data, signed and sealed by a registered professional engineer, indicating no water penetration up to 20 pounds per square foot differential pressure.

4. ASTM E1592 - Manufacturers test data, signed and sealed by a registered professional engineer, substantiating that roof system will meet the allowable wind pressures using an appropriate Factor of Safety in accordance with AISI S-100.

5. ASTM E2140 - Manufacturers test data, signed and sealed by a registered professional engineer, on a test specimen with no end lap, indicating that no water leakage was observed during the testing period of 6 hours with a 6” water head on the specimen.

G. Qualification Statements: For Manufacturer and Installer.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Manual indicating requirements and recommendations, to maintain the roof system, in good working condition.

B. Warranty Documentation: Submit final warranties required in this section.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: Manufacturer shall have a minimum of ten years experience in the manufacturing of metal roof systems similar to those required for this project. Manufacturer must have a current installer training program.

2. Installer Qualifications: Installer ("roofer") to perform the work of this section, shall have no fewer than 5 years of successful experience with the installation of metal roof systems similar to those required for this project. The installer shall be qualified by the roof panel manufacturer for installation of manufacturer-warranted systems.

B. Field Measurements: Prior to fabrication of panels, take field measurements of structure or substrates to receive panel system. Allow for trimming panel units, where final dimensions cannot be established prior to fabrication.

C. Mock-Ups: Install a 30 foot wide, quality control area of metal roofing, for review by the Architect. The Architect shall approve the quality of installation for the roof, prior to installing additional metal panels.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements: Deliver panels to jobsite properly packaged to provide protection against transportation damage. Panels too long to ship shall be site formed onto the roof by manufacturer’s factory personnel using manufacturer’s factory roll forming equipment.

B. Storage and Handling Requirements:

1. Exercise care in unloading, storing and erecting panels to prevent bending, warping, twisting, and surface damage.

2. Store all material and accessories above ground on well skidded platforms. Store under waterproof covering. Provide proper ventilation to panels to prevent condensation build-up between each panel.

3. Remove from site and replace panels which are damaged, or become water-stained during storage and handling.

1.8 WARRANTIES

A. Manufacturer Warranties:

1. Panel Material: Furnish manufacturers 25 year warranty covering the panel against rupture, structural failure, or perforation.

2. Panel Coating: Furnish manufacturer's 40-year warranty panel coating warranty covering cracking, checking, and peeling, and 30 year warranty covering fade and chalk.

3. Metal Roof Weathertightness Warranty:

a) Manufacturer’s Single Source Weathertightness Warranty

(1) Warranty term: 20 years commencing on date of substantial completion.

(2) Total manufacturer’s liability: NRL (No Repair Limit) / sq. ft.

(3) Warranty must cover: Pipe and Curb Penetrations; Wind Speeds up to 75 mph.

(a) Pipes must be centered in pan or a pipe curb must be used. Pipe must be flashed with an EPDM dektite.

(b) Curbs must be all welded aluminum or stainless steel.

(c) Manufacturer must supply engineered installation drawings signed and sealed by an engineer registered in the state in which the project is located.

B. Installer Warranty: Installer to provide warranty agreeing to repair or replace metal roof panels, trim, or accessories that fails due to poor workmanship or faulty installation.

1. Warranty term: 2 years commencing on date of substantial completion.

PART 2 - PRODUCTS

2.1 ROOF PANEL SYSTEM

A. Basis of Design: 238T by McElroy Metal, Inc. Bossier City, LA, or approved substitute.

1. Top panels:

a. Color: Regal White

b. Solar Reflective Index (SRI): Not less than 75 per ASTM E1980.

c. Reflectance and Emissivity:

1) Solar Reflectance: Not less than 0.63 per ASTM test methods C1549 or E1918, or CRRC-1 Method #1.

2) Thermal Emissivity: Not less than 0.75 per ASTM C1371.

2. Bottom and Side panels:

a. Color: Silver Metallic

b. Solar Reflective Index (SRI): Not less than 16 per ASTM E1980.

c. Reflectance and Emissivity:

1) Solar Reflectance: Not less than 0.20 per ASTM test methods C1549 or E1918, or CRRC-1 Method #1.

2) Thermal Emissivity: Not less than 0.75 per ASTM C1371.

B. Substitution Limitations

1. Requests for approval must be submitted in writing at least ten (10) days prior to bid date, and are accompanied by all related test reports and design calculations listed in section 1.4 and Design and Performance Criteria Section 2.2.

2. Substitute manufactures will be approved by written addendum to all bidders. Voluntary alternates will not be considered. Substitutions will not be permitted after the bid date of this project.

3. Roof panels proposed for substitution shall fully comply with specified requirements in appearance, assembly, and performance.

C. Product Options

1. Factory-formed panel, width of 24 inches. Panels shall be symmetrical in design and shall be mechanically seamed with a field operated electric seaming machine approved by the manufacturer.

2. Minimum seam height 2 3/8 inches. Integral seam, double lock and snap together type panels are not acceptable

3. Seam cap matching panel finish with two rows of integral factory hot applied sealant. Sealant should not come in contact with clip, and clip should not require sealant to maintain a weathertight condition.

4. Galvalume steel sheet conforming to ASTM A792, AZ55 coating for bare; AZ50 coating for painted; 24 gauge sheet thickness.

5. Finish: Two coat coil applied, baked-on full-strength (70% resin, PVF2) fluorocarbon coating consisting of a nominal 0.25 mil dry film thickness primer, and a nominal dry film thickness of 0.7 - 0.8 mil color coat for a total 0.9 to 1.1 mil total system dry film thickness. Finish to be selected from manufacturer's standard color selection. The back side of the material should be 0.25 mil primer and 0.25 mil polyester wash coat.

6. Roof panel system must allow individual roof panel removal and replacement from any point on the roof without damage to adjacent roof panel(s).

7. Roof panel system must be approved by manufacturer to be installed on slopes as low as ½:12.

8. Panels must be furnished and installed in continuous lengths from ridge to eave with no overlaps. Panels too long to ship will be manufactured on site using manufacturer's employees and equipment.

9. Panel surface characteristics to be Striated.

10. Manufacturer weathertightness warranty meeting requirements of this Section.

2.2 PERFORMANCE/DESIGN CRITERIA

A. Thermal Movement: Metal Roofing system, including flashing, shall accommodate unlimited thermal movement without buckling or excess stress on the structure.

B. Roof panel and trim attachments will be designed to satisfy the requirements of the roof design (shown in shop drawings).

C. Maximum wind uplift capacity of roof system shall be determined using ASTM E 1592 test results, with an appropriate Factor of Safety in accordance with AISI S-100.

D. Panel system shall be designed in accordance with the local building code and ASCE7 for project location with respect to appropriate Exposure category, Importance Factor and Factor of Safety in accordance with AISI S-100.

E. Tested and listed by Underwriters Laboratories to comply with UL 580 for wind uplift Class 90 rating.

2.3 ACCESSORIES

A. Panel Clip Screw - screw required in wind uplift rating requirements and design specification for application, with corrosion-resistant coating, in length necessary to penetrate substrate minimum 3/4 inch., as supplied by roof panel manufacturer.

B. Roof Panel Clip:

1. Intermittent Clip: 16 gauge galvanized steel, one-piece, designed to allow roof panel thermal movement and not contact roof panel cap, as supplied by roof panel manufacturer, meeting wind uplift requirements and design criteria of this section.

2. Intermittent Clip Bearing Plate: If required, in gauge, size and finish as supplied by and approved by roof panel manufacturer for use in roof panel manufacturer's full assembly warranted systems.

3. Multi-Span Clip: as provided by roof panel manufacturer for full assembly warranted systems.

C. Trim and flashing will be of the same gauge and finish unless approved otherwise by the metal roof system manufacturer.

1. Ridge closures, consisting of metal channel surrounding factory precut closed cell foam, will not be secured through the field of the panel.

2. Trim will be installed specifically as displayed in the manufacturer provided shop drawings. Proposed changes must be approved in writing by the metal roof system manufacturer.

D. Concealed supports, angles, plates, accessories and brackets: gauge and finish as recommended, and furnished by manufacturer.

E. Accessory Screw: Size and screw type as provided by panel manufacturer for each use, with prefinished hex washer head in color to match panels where exposed to view.

F. Rivets: full stainless steel, including mandrel, in size to match application.

G. Field Sealant:

1. Exposed Sealant: Color coordinated urethane or polymer sealant as supplied by panel manufacturer.

2. Non-exposed Sealant: Non-curing, non-skinning, butyl tape or tube sealant as supplied by manufacturer.

H. Sealant Tape: non-drying, 100 percent solids, high grade butyl tape, as supplied by panel manufacturer, in sizes to match application.

I. Pipe Penetration Flashings: 20 year warranted flexible boot type, with stainless steel compression ring. Use silicone type at hot pipes.

J. Metal Roof Curbs: 0.063 minimum thickness welded aluminum, or 18 gauge minimum welded stainless steel, factory-insulated, with integral cricket, and designed to fit roof panel module, sized to meet application.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Must be certified and qualified by Manufacturer.

3.2 EXAMINATION

A. Verification of Conditions

1. Ensure surfaces are ready for panel application.

2. Inspect and ensure surfaces are free from objectionable warp, wave, and buckle before proceeding with installation of pre-formed metal roofing.

3. Ensure substrate is ready to receive metal roofing. Report items for correction and do not proceed with metal roof panel system installation until resolved.

3.3 PREPARATION

A. Install substrate boards, hat channels, purlins, or furring channels in accordance with manufacturer's recommendations.

B. Coordinate Work, with installation of other associated Work, to ensure quality application.

C. Coordinate Work with installation of associated metal flashings and building walls.

D. Coordinate Work to minimize foot traffic and construction activity on installed finished surfaces.

E. Coordinate location of pipe penetrations to allow centering of pipe in panel.

F. Coordinate location of roof curbs, to allow proper integration with roof panel seams.

3.4 INSTALLATION

A. Comply with and install roofing and flashings in accordance with all details shown on manufacturer's approved shop drawings and manufacturer's product data, instructions, and installation manuals, within specified erection tolerances.

B. Install field panels in continuous lengths, without endlaps

C. Do not install panels damaged by shipment or handling.

D. Install intermittent clips with bearing plates, if required, and continuous clips, if required, according to the engineered design pattern in the field, perimeter, and corner areas of the roof.

E. Fix panels at location depicted on reviewed shop drawing(s).

F. Fold up pan of panel at ridge, hip and headwalls. Commonly referred to as breadpanning.

G. Allow for required panel clearance at penetrations for thermal movement.

H. Install concealed supports, angles and brackets as furnished by manufacturer to form complete assemblies.

I. Remove roof panel and flashing protective film prior to extended exposure to sunlight, heat, and other weather elements.

J. Field-apply sealant tape and gun-grade sealant according to reviewed shop drawings and manufacturer's requirements for airtight, watertight installation.

K. Ensure sealant beads and tapes are applied prior to sheet metal installation to achieve a concealed bead. Neatly trim exposed portions of sealant without damaging roof panel or flashing finish.

L. Align pipe penetrations to occur at center of roof panel. Report and have corrected improperly-placed penetrations before proceeding with panel installation. Remove and replace roof panels which have improperly-placed penetration flashings.

M. Align roof curbs to fit roof panel module and overlap standing seam(s). Allow for proper drainage on both sides of curb.

N. Install sheet metal flashings according to manufacturer's recommendations, reviewed shop drawings and in accordance with provision of Section 07 62 00.

3.5 CLEANING

A. Clean exposed surfaces of work promptly after completion of installation.

B. Clean mud, dirt, and construction-related debris from panels before panels are scratched or marred.

3.6 PROTECTION

A. Protect Work as required to ensure roofing will be without damage at time of final completion.

B. Do not allow excessive foot traffic over finished surfaces.

C. Do not track mud, dirt, or construction-related debris onto panel surfaces.

D. Replace damaged Work before final completion.

END OF SECTION

SECTION 07 42 13
METAL WALL PANELS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes complete system of concealed-fastener, lap-seam metal panels in the following applications:

1. Metal wall panels.
2. Metal liner panels.
3. Metal soffit panels.

B. Related Requirements:

1. Section 05 50 00 – Metal Fabrications
2. Section 06 10 00 – Rough Carpentry
3. Section 07 21 00 – Building Insulation
4. Section 07 25 00 – Weather Barriers
5. Section 07 90 00 – Joint Sealants

1.03 REFERENCES

A. Reference Standards:

1. ASCE 7: Minimum Design Loads for Buildings and Other Structures.
2. ASTM A653: Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
3. ASTM A792: Steel Sheet, 55% Aluminum Zinc Alloy Coated by the Hot Dip Process
4. ASTM C1371: Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
5. ASTM C1549: Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
6. ASTM D523: Specular Gloss.
7. ASTM E283: Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
8. ASTM E331: Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

9. ASTM E1592: Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

10. ASTM E1918: Measuring Solar Reflectance of Horizontal and Low Sloped Surfaces in the Field.

11. ASTM E1980: Calculating Solar Reflectance Index of Horizontal and Low Sloped Opaque Surfaces.

12. CRRC-1 Method #1: Measuring Solar Reflectance of a Flat, Opaque, and Heterogeneous Surface Using a Portable Solar Reflectometer.

13. SMACNA Architectural Sheet Metal Manual.

1.04 SUBMITTALS

A. Product Data.

B. Shop Drawings:

1. Indicate thickness and dimensions of parts, fastenings and anchoring methods, details and locations of joints, transitions and other provisions necessary for thermal expansion and contraction.

2. Indicate locations of field- and factory-applied sealant.

C. Samples:

1. Submit two samples, 12 inches long by full panel width, showing proposed metal thickness and seam profile.

2. Submit standard color samples of metal for Architect's selection.

D. Manufacturer Qualifications.

E. Installer Qualifications: Submit list of completed projects, with names and contact information for architects and contractors.

F. Test Reports: Indicating compliance of products with project requirements.

G. Warranty Documentation.

H. Insurance Documentation

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Ten years' experience, minimum, in factory fabrication of metal panels.

2. Manufacturer shall carry $2,000,000 liability insurance, minimum, for metal panel system.

B. Installer Qualifications:

1. Three years' experience, minimum, in application of metal roof or wall panels.

2. Five satisfactory projects with metal panel work of similar scope and complexity to Work of this Project.

C. Testing Agency Qualifications: Agency compliant with ISO/IEC Standard 17025, or an accredited independent agency recognized by the International Laboratory Accreditation

Cooperation Mutual Recognition Arrangement or ANSI.

D. Mock-Ups:

1. Visual Mock-Up: Construct mock-up, 10 by 10 feet or larger as required to show at least two pattern repeats, and in same orientation for Architect of both panel types.

2. Performance Mock-Up: Construct metal panel system as required for Performance Mock-Up.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:

1. Keep panels and accessory items dry.

2. Protect against damage and discoloration.

3. Handle panels with non-marring slings.

4. Support panels to prevent permanent deformation.

5. Store panels above ground, with one end elevated for drainage.

6. Protect panels against standing water and condensation between adjacent surfaces.

7. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and keep sheets separate for air-drying.

8. Painted panels shall be shipped with protective plastic sheeting or a strippable film coating between panels. Remove strippable film coating prior to installation. Do not allow strippable film coating to remain on panels in extreme heat, cold, or direct sunlight or other UV source.

1.07 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard 25-year performance warranty, stating the following:

1. Architectural fluorocarbon finish:

a. Will be free of fading or color change in excess of 5 Hunter delta-E units as determined by ASTM D2244-02.

b. Will not chalk in excess of numerical rating of 8 when measured in accordance with standard procedures specified in ASTM D4214-98 method D659.

c. Will not peel, crack, chip, or delaminate.

2. Metal substrate will not rupture, fail structurally, or perforate.

B. Installer's Warranty: Warrant panels, flashings, sealants, fasteners and accessories against defective materials and/or workmanship, covering repairs required to maintain wall panels watertight and weatherproof with normal usage for two years following Project Substantial Completion date.

1. Furnish written warranty, signed by installer.

2.00 PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Products: Provide the following:

1. AEP Span, a Division of ASC Profiles, Inc.; Prestige Series.

2. AEP Span, Nu-Wave Corrugated.

B. Substitution Limitations: Substitutions will not be considered.

C. Performance Criteria:

1. Wind Uplift: As required by ASCE 7.

a. Panel system shall be ASTM E1592 tested under the supervision of an ANSI or ISO/IEC accredited laboratory and the laboratory shall issue the test report. Test data based on ASTM E330 is not acceptable.

b. Deflection Limits: Withstand wind loads with deflections no greater than 1/180 of the span.

2. Air Infiltration: 0.06 cfm/lf, maximum at a static difference of 1.57 psf when tested with sidelap sealant per ATM E283.

3. Water Penetration Under Static Pressure: No leakage at 12 psf when tested with sidelap sealant per ASTM E331.

4. Thermal Movements: Accommodate thermal movement without buckling, joint opening, failure of connections, or other detrimental effects, through the following temperature changes:

a. 120 degrees F, ambient.

b. 180 degrees F, surface.

2.02 PANELS

A. Panels: AEP Span, a Division of ASC Profiles, Inc.; Prestige Series.

1. Material: Steel conforming to ASTM A792.

a. 22 Gauge: Yield strength 50,000 psi; with aluminum-zinc alloy coating conforming to ASTM A792, Class AZ50.

b. Thickness and yield strength as required for performance indicated; with aluminum-zinc alloy coating conforming to ASTM A792, Class AZ50 or with zinc coating conforming to ASTM A653, Class G 90.

2. Profile and Pattern: As scheduled.

a. Full 12-inch Panel, flat (no ribs).

B. Panel: AEP Span, Nu Wave Corrugated.

1. Material:

a. Steel conforming to ASTM A792 Zincalume/Galvalume, minimum yield

50,000 psi, thickness 22.

2. Protective Coating:

a. Conform to ASTM A792, AZ50 (Zincalume/Galvalume).

C. Finishes:

1. Exterior Panel Finish: Provide primer and finish coat on exposed faces; provide primer on concealed faces of panels.

a. DuraTech 5000: Polyvinylidine Fluoride, full 70 percent Kynar 500/Hylar 5000, consisting of a baked-on 0.15-0.20 mil corrosion resistant primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 8 to 15 when tested in accordance with ASTM D523 at 60 degrees.

b. Prestige Panel: Zincalume.

c. Nu-Wave Corrugated Panel: Cod Red.

2. Interior Panel Finish: Corrosion-resistant primer; primer coat dry film thickness: 0.15 mils; polyester paint; dry film thickness of 0.35 mils, off-white to light gray in color. Both Panel Types.

3. Sidelap Sealant: Factory apply sealant, except where no sealant is required. Field-applied sealant is not acceptable.

D. Sustainability Characteristics:

1. Recycled Content: 28.9 percent post-consumer recycled content.

2. Solar Performance:

a. Solar reflective index (SRI): Not less than 29 per ASTM E1980.

b. Solar Reflectance: Not less than 0.25 per ASTM test methods C1549 or E1918, or CRRC-1 Method #1.

c. Thermal Emissivity: Not less than 0.75 per ASTM C1371.

3. Shipping Distance: Provide panels manufactured at the following factory:

a. Fontana, California 92335

b. Tacoma, Washington 98421

E. Manufacturing Characteristics: Provide panels complying with provisions of Buy American Act 41 U.S. C 10a – 10d.

2.03 FRAMING AND SUBSTRATES

A. Secondary Framing: See Section 05 40 00 – Cold-Formed Metal Framing.

B. Sheathing: See Section 06 16 43 – Gypsum Sheathing.

C. Weather Barrier: See Section 07 25 00 – Weather Barriers

2.04 ACCESSORIES

A. Clip: Panel clip with spring tab at one end and hold-down clamp at other end, sized to fit panels.

1. Product: AEP Span; Prestige Series Clip.

2. Material: 16 gauge formed steel, galvanized in conformance with ASTM A-653 Class G90.

B. Trims and Flashings: Material, metal thickness, and finish to match panels. Profiles indicated in Drawings.

C. Panel Penetration Flashings: As recommended by panel manufacturer.

D. Fasteners: Per manufacturer's recommendation.

E. Profile Closures: Polyethylene foam, die-cut or formed to panel configuration.

F. Sealant for Field Application: See Section 07 90 00 – Joint Sealers.

G. Insulation: See Section 07 21 00 – Building Insulation.

H. Acoustic Insulation: See Section 09 84 00 – Acoustical Wall Treatment.

2.05 FABRICATION

A. Fabrication, General:

1. Unless otherwise shown on Drawings or specified herein, fabricate panels in continuous lengths and fabricate flashings and accessories in longest practical lengths.

2. Panels shall be factory correctively-leveled.

B. Fabrication Tolerances:

1. Flat metal surfaces will display waviness commonly referred to as "oil canning". This is caused by steel mill tolerances and is a characteristic, not a defect, of panels manufactured from light gauge metal. Panels are factory correctively-leveled to minimize the occurrence of "oil canning". As such, "oil canning" will not be accepted as cause for rejection.

3.00 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: With Installer present.

1. Examine conditions and substrates on which metal panels are to be installed. Structural support or substrate shall be flat and plumb to avoid panel stresses and distortion.

2. Verify that weather barrier work is complete and inspected.

3. Prior to starting work, correct defects.

B. Field Measurements:

1. Coordinate field measurements and fabrication schedule with construction progress.

2. Field measure prior to fabrication. Show recorded dimensions on shop drawings, including locations of shop-fabricated openings.

3. If field measurements differ from drawing dimensions, notify Architect prior to fabrication.

C. Framing or Substrate Tolerances: Deviations from flat plane shall not exceed the following:

1. 1/4 inch in 20 feet vertically or horizontally.

2. 1/2 inch across building elevation.

3. 1/8 inch in 5 feet.

3.02 PREPARATION

A. Protection:

1. Treat contacting surfaces of dissimilar materials to prevent electrolytic corrosion.

2. Where panels or trim may come in contact with dissimilar materials or treated lumber, fabricate transitions to facilitate drainage and minimize possibility of galvanic corrosion.

3. At points of contact with dissimilar metal or treated lumber, coat panel or trim with protective paint or separate materials with a weatherproof underlayment.

4. Direct contact or run-off from CCA, ACQ, AC, or other treated lumber (outdoor wood) or fire retardant impregnated or treated wood shakes or siding can cause panels and trim to fail prematurely. Avoid contact with these materials.

3.03 INSTALLATION

A. Secondary Framing, Substrate and Weather Barrier: Install according to approved shop drawings and metal panel manufacturer's recommendations.

B. Panels and Flashing:

1. Install according to approved shop drawings.

2. Comply with methods and recommendations of SMACNA Architectural Sheet Metal Manual for flashing configurations required.

3. Overlap flashing at least 6 inches.

4. Discrepancies between job site conditions and shop drawings shall be brought to the attention of the Architect for resolution.

5. Cutting and Fitting:

a. Cut panels neat, square, and true with shearing action cutters. Torch or power saw cutting is prohibited.

b. Openings 6 inches and larger: Shop fabricate and reinforce to maintain original load capacity.

c. Openings less than 6 inches: Field cutting is acceptable.

C. Accessories: Install trims, panel closures, flashings according to Drawings and manufacturer's recommended details.

D. Sealant Installation: Apply according to approved shop drawings and SMACNA Architectural Sheet Metal Manual recommendations.

D. Installation Tolerances: Match dimensional tolerances of framing or substrate.

1. Flatness:

2. Variation from Vertical:

3. Variation from Level:

3.04 CLEANING

A. Repairs:

1. Touch up paint is not required for panels with scratches that do not expose metal.

2. Panels or flashings with finish damage exposing metal or with substrate damage shall be replaced.

B. Cleaning and Waste Management: See Division 01 – Section "Construction Waste Management and Disposal" for recycling requirements. At completion of each day's work and at work completion, sweep panels, flashings, and gutters clean. Do not allow fasteners, cuttings, filings, or scraps to accumulate.

END OF SECTION

SECTION 07 50 00
MEMBRANE ROOF BOARDS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes Fiberglass-mat faced gypsum roof boards.

1.03 REFERENCES

A. ASTM International (ASTM):

1. ASTM C 472 Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete.

2. ASTM C 473 Standard Test Methods for Physical Testing of Gypsum Panel Products.

3. ASTM C 518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

4. ASTM C 840 Standard Specification for Application and Finishing of Gypsum Board.

5. ASTM C 1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

6. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.

7. ASTM E 96 Standard Test Methods for Water Vapor Trransmission of Materials.

8. ASTM E 108 Standard Test Methods for Fire Tests of Roof Coverings.

9. ASTM E 661 Standard Test Method for Performance of Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads.

1.04 SUBMITTALS

A. Product Data: Manufacturer's specifications and installation instructions for each product specified.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Provide products that comply with the following limits for surface burning characteristics when tested per ASTM E 84:

1. Flame Spread: 15, maximum.

2. Smoke Developed: 0.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Georgia-Pacific Gypsum LLC:

1. Fiberglass Mat Faced Gypsum Roof Board:

a. DensDeck.

2.02 MATERIALS

A. Fiberglass Mat Faced Gypsum Roof Board:

1. Thickness: 1/2 inch

2. Width: 4 feet

3. Length: 8 feet

4. Weight: 2.0 lb/sq. ft.

5. Surfacing: Fiberglass mat

6. Flexural Strength, Parallel (ASTM C 473): 80 lbf, minimum

7. Flute Span (ASTM E 661): 5 inches

8. Permeance (ASTM E 96): Greater than 35 perms

9. R-Value (ASTM C 518): 0.56

10. Water Absorption (ASTM C 1177): Less than 10 percent of weight.

11. Compressive Strength (Applicable Sections of ASTM C 472): 900 pounds per square inch

12. Surface Water Absorption (ASTM C 473): Not more than 2.5 grams

13. Acceptable Products:

a. DensDeck, Georgia-Pacific Gypsum

3.00 EXECUTION

3.01 INSTALLATION

A. Adhered or Mechanically Attached: As recommended by roof system and/or adhesive manufacturer or as required by FM or UL guidelines for wind uplift resistance.

1. Manufacturer's Recommendations: Current "Product Catalog", Georgia-Pacific Gypsum.

3.02 PROTECTION

A. Protect gypsum board installations from damage and deterioration until the date of Substantial Completion.

END OF SECTION

SECTION 07 54 23
SINGLE PLY ROOFING

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

A. The Sure-Flex Mechanically-Fastened Roofing System incorporates 60-mil Polyester Reinforced Sure-Flex Polyvinyl Chloride (PVC) membrane (white membrane). Insulation is mechanically fastened to metal roof deck using the appropriate Carlisle Fasteners and RhinoBond or Isoweld Plates. Sure-Flex membrane is positioned over the secured RhinoBond or Isoweld plates and welded to the top surface of the plate with the RhinoBond or Isoweld Induction Welding Tool. Adjoining sheets of Sure-Flex membrane are overlapped and joined together with a minimum 1-1/2 inch wide heat weld. Membrane fastening requirements are outlined in Warranty Tables in the Thermoplastic Specification. Provide for 90 mph wind.

1.03 QUALITY ASSURANCE

A. This roofing system must be installed by a Carlisle-Authorized Roofing Applicator in compliance with shop drawings as approved by Carlisle.

B. Upon request, an inspection shall be conducted by a Field Service Representative of Carlisle to ascertain that the membrane roofing system has been installed according to Carlisle's published specifications and details applicable at the time of bid. This inspection is to determine whether a warranty shall be issued. It is not intended as a final inspection for the benefit of the owner.

C. For specific code approvals achieved with this system, refer to Carlisle's Sure-Flex Code Approval Guide, FM Approvals or UL Fire Resistance Directory for Roofing Materials and System.

1.04 SUBMITTALS

A. To ensure compliance with Carlisle's warranty requirements, the following projects should be forwarded to Carlisle for review prior to installation, preferably prior to bid.

1. Air pressurized buildings, canopies, and buildings with large openings, cold storage buildings or freezer facilities, adhered roofing system projects over 100 feet in height or projects where the membrane is expected to come in direct contact with petroleum-based products, waste products (i.e., grease, oil, animal fats, etc.) and other chemicals.

B. Shop drawings must be submitted to Carlisle by the Carlisle-Authorized Roofing Applicator along with a completely executed Notice of Award for approval. Approved shop drawings are required for inspection of the roof and on projects where on-site technical assistance is requested.

1.05 WARRANTY

A. Upon successful completion of work, provide the following warranty:

1. Twenty (20) year full system warranty (90 mph maximum wind speed).

1.06 PRODUCT DELIVERY, STORAGE AND HANDING

A. Deliver materials to the job site in the original, unopened containers labeled with the manufacturer's name, brand name and installation instructions.

B. Store Sure-Flex membrane in the original undisturbed plastic wrap.

C. Job site storage temperatures in excess of 90 degrees F. may affect shelf life of curable materials (i.e., adhesives and sealants).

D. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60 degrees Fahrenheit before use.

E. Do not store adhesive containers with opened lids due to the loss of solvent, which will occur from flash off.

1.07 JOB CONDITIONS

A. Refer to Carlisle Technical Manual for applicable project specific Job Conditions.

2.00 PRODUCTS

2.01 GENERAL

A. The components of this roofing system are to be products of Carlisle or accepted by Carlisle as compatible. The installation, performance or integrity of products by others, when selected by the specifier and accepted by Carlisle, is not the responsibility of Carlisle and is expressly disclaimed by the Carlisle Warranty.

2.02 MEMBRANE

A. Sure-Flex white, 60-mil polyester-reinforced Polyvinyl Chloride (PVC) membrane is used for this system.

2.03 RELATED MATERIALS

A. Sure-Flex Non-Reinforced Flashing, Reinforced Cover Strips, Cut Edge Sealant, Water Cut-Off Mastic, PVC Membrane Cleaner, One-Part Pourable Sealer, Heat Weldable Walkway Pads, Pre-Molded Inside/Outside Corners, Pipe Flashings and Sealant Pockets.

3.00 EXECUTION

3.01 GENERAL

A. When feasible, begin the application at the highest point of the highest roof level and work to the lowest point to prevent moisture infiltration and to minimize construction traffic on completed sections. This will include completion of all flashings, terminations and daily seals.

3.02 ROOF DECK CRITERIA

A. Proper substrate shall be provided by contractor. The structure shall be sufficient to withstand normal construction loads and live loads.

B. Defects in the roof deck must be reported and documented to the specifier and general contractor for assessment. The Carlisle-Authorized Applicator shall not proceed with installation unless defects are corrected.

C. Refer to Carlisle Technical Manual for acceptable decks and the applicable Sure-Seal Fasteners (when mechanical attachment of insulation is specified).

3.03 SUBSTRATE PREPARATION

A. Substrate must be even without noticeable high spots or depressions, and must be free of accumulated water, ice or snow.

B. Clear the substrate of debris and foreign material. Fresh bitumen based roof cement must be removed or concealed.

3.04 INSTALLATION

A. Refer to the applicable Material Safety Data Sheets and Technical Data Bulletins for applicable cautions and warnings.

B. Insulation Attachment:

1. After placement of insulation on substrate, secure the insulation at a rate of six (6) HP-X Fasteners and RhinoBond or Isoweld Plates per 4 ft x 8 ft in the designated field and eight (8) HP-X Fasteners and RhinoBond or Isoweld Plates around the perimeter. Refer to appropriate Carlisle detail for patterns and depth of perimeter area. See Section 07 21 00 for rigid insulation.

   Note: Avoiding fastener overdrive to prevent plate from deforming.

C. Membrane Placement, Attachment and Hot Air Welding:

1. Place Sure-Flex membrane over the appropriate RhinoBond or Isoweld Plates and allowing membrane to relax.

2. Place RhinoBond Induction Tool over the RhinoBond PVC Welding Plate, under the roofing membrane OR place the Isoweld Induction Tool over the Isoweld PVC Welding Plate, until the acoustic search mode signals the inductor is properly positioned.

3. Activate induction welding tool and leave in place until heating cycle is complete.

4. Immediately place the magnet on the membrane over the plate and leave in place for at least 60 seconds.

5. Resume process ensuring membrane is attached to all plates.

6. Overlap adjacent membrane a minimum of 2 inches at end roll sections (width of the membrane).

7. Hot air weld the membrane sheets a minimum of 1-1/2 inches with an Automatic Hot Air Welding Machine.

8. Membrane that has been exposed to the elements for approximately 7 days must be prepared with PVC Membrane Cleaner. Wipe the surface where PVC Membrane Cleaner has been applied with a clean, dry HP Splice Wipe or other white rag to remove cleaner residue prior to hot air welding.

D. Additional Membrane Securement:

1. The membrane must be secured at the perimeter of each roof level, roof section, expansion joint, curb, skylight, interior wall, penthouse, etc., at any angle change which exceeds 2 inches in one horizontal foot and at all other penetrations in accordance with Carlisle's Details published with Carlisle's Specifications.

E. Membrane Flashing:

1. Flash all walls and curbs with Sure-Flex reinforced membrane. Non-Reinforced membrane shall be limited to inside and outside corners, field fabricated pipe seals, scuppers and Sealant Pockets where the use of pre-molded accessories are not practical.

2. On vertical surfaces, such as walls, curbs and pipes, Bonding Adhesive is not required when the flashing height is 12 inches or less and the membrane is terminated under a metal counterflashing (nailed). When a coping or termination bar is used for vertical terminations, Bonding Adhesive may be eliminated for flashing heights 18 inches or less.

3. Terminate the flashing in accordance with an appropriate Carlisle Details above anticipated slush line.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

A. Coping, parapet, cap, sill, lintel, and other flashings and sheet metal work.

1.03 RELATED SECTIONS

A. Section 07 54 23 – Single Ply Roofing System

B. Section 07 41 13 – Metal Roof Panels

C. Section 07 63 10 – Gutters and Downspouts

D. Section 07 70 00 – Roof Accessories

E. Section 07 90 00 – Joint Sealers

F. Section 09 90 00 – Painting: Prime and finish painting.

1.04 REFERENCES

A. ASTM A525 – Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.

B. NRCA (National Roofing Contractors Association) – Roofing Manual.

C. SMACNA – Architectural Sheet Metal Manual.

1.05 SUBMITTALS

A. Submit under provisions of Section 01340.

B. Shop Drawings: Indicate material profile, jointing pattern, corners jointing details, fastening methods, flashings, terminations, and installation details.

C. No exposed fastening devices will be allowed unless approved by shop drawings.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA and NRCA standard details and requirements.

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1.07 QUALIFICATIONS

A. Fabricator and Installer: Company specializing in sheet metal flashing work with 5 years experience.

1.08 GUARANTEE

A. Issue a written guarantee to maintain the sheet metal and flashing work in a watertight condition for a period of five (5) years after date of completion and acceptance of the Contract Work.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials which may cause discoloration or staining.

1.10 COORDINATION

A. Coordinate work under provisions of Section 01200.

2.00 PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A446, Grade A, G90 zinc coating 1.25 oz/sf hot dipped; 24 gage minimum or as noted on drawings.

2.02 ACCESSORIES

A. Nails, Rivets, and Fasteners: Use only soft iron rivets having rust-resistive coating, galvanized nails, and cadmium plated screws and washers in connection with galvanized iron and steel.

B. Sealant: Specified in Section 07 90 00.

C. Bedding Compound: Butyl type.

D. Plastic Cement: ASTM D4586, Type I., II.

2.03 SHEET METAL FABRICATION AND WORKMANSHIP

A. Sheet metal work shall be accurately formed to dimensions and shapes detailed, using best shop practice methods. Soldering shall be done slowly, neat, full flowing and as thin as consistent with good joints. Materials at joints shall be thoroughly cleaned and tinned prior to soldering. Exposed soldering on finished surfaces shall be scrapped smooth. Lock seam work shall be made flat, true to line form pieces in longest lengths possible.

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B. All sheet metal work shall be so formed and installed as to allow for expansion and contraction without causing undue stresses in any part or the work.

C. Weatherproofing:

1. Finish all flashing watertight and weathertight.

2. Make lock seam work flat and true to line, and watertight.

3. Joints shall be “Butt-type” with back-up plates 6” long of same gauge metal and profile and buttered both ends with sealant.

4. Expansion joints shall be similar to 5. With buttered back-up plate on one-half only and occurring at lengths more than 40'0”, except where closer spacing is indicated in the Drawings or required for proper installation.

5. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

D. Nailing:

1. Whenever possible, secure metal by means of clips or cleats, without penetrating the exterior metal.
2. In general, space nails, rivets, and screws not more than 8” apart. Where exposed to exterior set in sealant.

3. For nailing into wood, use barbed roofing nails 1-1/4-inches long by 11 gauge.

3.00 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install cleats before starting installation.

B. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

3.03 INSTALLATION

A. Conform to details as indicated on drawings and included in the SMACNA & NRCA manual.

B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted by Architect.

C. Apply plastic cement compound between metal flashings and felt flashings.

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D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Seal metal joints watertight.

3.04 DESCRIPTION OF ITEMS

A. Those items which are of standard or stock design or which are sufficiently detailed or described on the drawings to permit their fabrication and installation, are not covered herein even though they may be included in the scope.

B. Backing plates in connection with studs and furring necessary for engaging and fastening of all items of wall hung or wall supported equipment shall be provided in locations indicated, or as necessary. Plates shall be of sufficient thickness to support the intended equipment, but not less than 16 gage. Securely fasten backing plates to supporting members in required position. Finish with rust inhibitive prime coat.

C. Brackets Supporting Cabinets: Provide as indicated or required.

3.05 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Section 01400.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

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SECTION 07 63 10
GUTTERS AND DOWNSPOUTS

1.00 GENERAL:

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

A. Precoated Galvanized steel gutters and downspouts.

B. Precast concrete splash pads.

1.03 RELATED SECTIONS

A. Section 07 41 13 - Metal Roof Panels.

B. Section 07 62 00 - Sheet Metal Flashing and Trim.

C. Section 09 90 00 - Painting: Field painting of metal surfaces.

1.04 REFERENCES

A. ASTM A167 - Stainless and Heat-Resisting, Chromium-Nickel Steel Plate.

B. ASTM A446 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

C. ASTM B32 - Solder Metal.

D. ASTM B209 - Aluminum and Aluminum Alloy Sheet and Plate.

E. ASTM B370 - Copper Sheet and Strip for Building Construction.

F. ASTM B486 - Paste Solder.

G. FS O-F-506 - Flux, Soldering, Paste and Liquid.

H. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.

I. SMACNA - Architectural Sheet Metal Manual.

1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

C. Product Data: Provide data on prefabricated components.

D. Samples: Submit two (2) samples, 12 inch long illustrating component design, finish, color, and configuration.

1.06 QUALITY ASSURANCE

A. Conform to SMACNA Manual for sizing components for rainfall intensity determined by a storm occurrence of 1 in 10 years.

B. Maintain one (1) copy of each document on site.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for size and method of rain water discharge.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site to prevent damage.

B. Stack preformed [and prefinished] material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.

C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

1.09 COORDINATION

A. Coordinate the work with downspout discharge pipe inlet.

2.00 PRODUCTS:

2.01 MATERIALS

A. Pre-Coated Galvanized Steel: ASTM A446, Grade A, G90 zinc coating; 20 gage core steel, shop pre-coated with modified silicone coating color selection by Architect.

2.02 COMPONENTS

A. Gutters: SMACNA 5”x6” Rectangular profile.

B. Downspouts: SMACNA Rectangular profile.

C. Accessories: Profiled to suit gutters and downspouts.

D. Splash Pads or Blocks: Precast concrete type, of size and profile indicated; minimum 3000 psi (21 Mpa) at 28 days, with minimum 5 percent air entrainment.

2.03 ACCESSORIES

A. Anchorage Devices: SMACNA requirements.

B. Gutter Supports: Brackets.

C. Downspout Supports: Straps.

D. Fasteners: Finish exposed fasteners same as flashing metal.

E. Primer: Zinc chromate

F. Protective Backing Paint: Zinc chromate alkyd.

G. Solder: ASTM B32; 50/50 type.

H. Flux: FS O-F-506

2.04 FABRICATION

A. Form gutters and downspouts of profiles and size indicated.

B. Fabricate with required connection pieces.

C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. [Allow for expansion at joints.]

D. Hem exposed edges of metal.

E. Fabricate gutter and downspout accessories; solder watertight.

2.05 FINISHES

A. Prepare surfaces in accordance with Section 09 90 00 .

B. Apply bituminous protective backing on surfaces in contact with dissimilar materials.

3.00 EXECUTION:

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

3.02 INSTALLATION

A. Install gutters, downspouts, and accessories in accordance with SMACNA standards or manufacturer's instructions.

B. Join lengths with seams soldered watertight. Flash and solder gutters to downspouts and accessories.

C. Install gutters level with trim.

D. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

E. Connect downspouts to storm sewer system. Seal connection watertight.

F. Use Cast Iron pipe under walkways make transition to PVC as required.

G. Set splash blocks under downspouts where indicated. See plans for locations.

END OF SECTION

COASTAL CHRISTIAN SCHOOL

SECTION 07 70 00
ROOF ACCESSORIES

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

A. Principal Work in this Section:

1. Roof hatches

B. Related Work:

1. All other sheet metal and flashings.

2. Finish Painting Roof Accessories: Reference Section 09 90 00.

1.03 SUBMITTALS

A. Make submittals in compliance with the requirements of Section 01340.

B. Submit manufacturer's data for the roof accessories, supplemented by shop drawings showing attachment to supports.

1.04 HANDLING

A. Comply with the requirements of Section 01600.

2.00 PRODUCTS

2.01 MATERIALS

A. Roof Hatch: Of the profiles and dimensions indicated by The Bilco Co., Babcock-Davis Assoc., Inc. or DurRed Products, Inc.

1. Furnish and install where indicated on plans metal roof hatch Type NB, size width: 2'6" (762mm) x length: 4'6" (1372mm). Length denotes hinge side. The rood hatch shall be single leaf. The roof hatch shall be preassembled from the manufacturer.

2. Performance characteristics:

a. Cover shall be reinforced to support a minimum live load of 40 psf (195 $kg/m^{2)}$ wind uplift.

b. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.

c. Operation of the cover shall not be affected by temperature.

d. Entire hatch shall be weathertight with fully welded corner joints on cover and curb.

3. Cover: Shall be 14 gauge paint bond G-90 galvanized steel with a 3” (76mm) beaded flange with formed reinforcing members. Cover shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.

4. Cover insulation: Shall be fiberglass of 1” (25.4mm) thickness, fully covered and protected by a metal liner 22 gauge paint bond G-90 galvanized steel.

5. Curb: Shall be 12” (305mm) in height and of 14 gauge paint bond G-90 galvanized steel. The curb shall be formed with a 3-1/2” (89m) flange with 7/16” (11.1mm) holes providing for securing to the roof deck. The curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners, the features the Bil-Clip® flashing system, including stamped tabs, 6” (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place.

6. Curb insulation: Shall be rigid, high-density fiberboard of 1” (25.4mm) thickness on outside of curb.

7. Lifting mechanisms: Manufacturer shall provide compression spring operations enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe [for aluminum construction: welded to the curb assembly; for steel construction: through bolted to the curb assembly]

8. Hardware:

a. Heavy pintle hinges shall be provided.

b. Cover shall be equipped with a spring latch with interior and exterior turn handles.

c. Roof hatch shall be equipped with interior and exterior padlocks hasps.

d. The latch strike shall be a stamped component bolted to the curb assembly.

e. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1” (25.4mm) diameter red vinyl grip handle to permit easy release for closing.

f. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed.

g. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

9. Finishes: Factory finish shall be [select: alkyd based red oxide primed steel or mill finish aluminum].

3.00 EXECUTION

3.01 INSPECTION

A. Verify conditions and measurements affecting the work of this Section at site. Make sure that detrimental conditions are corrected before proceeding with installation.

3.02 INSTALLATION

A. Install roof accessories in compliance with their manufacturer's printed instructions and the Drawings, over the prepared openings, plumb, level and square, to produce weathertight installations.

B. Adjust and lubricate roof hatch covers and vents where necessary, for smooth operation and weathertight closure.

3.03 REPLACEMENT

A. Promptly replace components damaged beyond satisfactory field repair before their acceptance, with new components at no additional cost to the District.

END OF SECTION

SECTION 07 90 00
JOINT SEALERS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

A. Preparing substrate surfaces.

B. Sealant and joint backing.

C. Work includes interior and exterior caulking and sealing, in not less than the following circumstances:

1. Wherever expansion and contraction occurs.

2. Between materials and products where infiltration of moisture, water, light or air blown particles may occur.

3. Between materials and products in, or penetrating sound insulated walls, portion and related construction.

4. Between exposed dissimilar materials.

1.03 REFERENCES

A. ASTM C790 – Use of Latex Sealing Compounds.

B. ASTM C804 – Use of Solvent-Release Type Sealants.

C. ASTM C834 – Latex Sealing Compounds.

D. ASTM C919 - Use of Sealants in Acoustical Applications.

E. ASTM C920 – Elastomeric Joint Sealants.

F. ASTM D41056 – Flexible Cellular Materials – Sponge or Expanded Rubber.

G. ASTM D1565 – Flexible Cellular Materials – Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).

H. SWRI (Sealant, Waterproofing and Restoration Institute) – Sealant and Caulking Guide Specification.

1.04 SUBMITTALS

A. Submit under provisions of Section 01340.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations and color availability.

C. Samples: Submit two samples, illustrating sealant colors for selection. Custom colors maybe required.

D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform acoustical sealant application work in accordance with ASTM C919 and C1193.

C. Comply with applicable codes and regulations of governmental agencies with ASTM C919 and C1193.

D. Where provisions of applicable codes, regulations and standards conflict with the requirements of this Specification, comply with the more stringent provisions.

E. Tests: Material for which physical characteristics have been stipulated shall have such characteristics independently confirmed by laboratory tests employing industry-recognized procedures. Both the laboratory performing the tests and the test methods employed will be subject to the approval of the Architect.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years experience.

B. Applicator: Company specializing in performing the work of this section with a minimum five (5) years experience.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.08 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.09 WARRANTY

A. Provide five (5) year warranty under provisions of Section 01740.

B. Warranty: Include coverage for installed sealants and accessories which fail to achieve air tight seal and water tight seal, and exhibit loss of adhesion or cohesion, or do not cure.

2.00 PRODUCTS

2.01 SEALANT MATERIALS

A. Polysulfide Sealant:

1. Polysulfide base sealing compound. Sealant shall conform to performance standards of Thiokol Chemical Corp. and all containers of sealant delivered to project shall bear Thiokol “tested and approved” seal. Provide Type I (self-leveling) for joints in horizontal surfaces and Type II (non-sag) in joints vertical or overhead surfaces. Class A or Class B shall be used for structural movements subject to 25 percent or 50 percent joint elongation respectively.

a. Two-part: FS TT S 00227.

B. Polyurethane Sealant: Multi-part, self-leveling, FS TT S-00227, Type I, Class A. Equivalent to THC-900 by Tremco.

C. Acrylic Terpolymer Sealant: One-part non-sag, FS TT S-00230. Equal to “Mono” by Tremco. Use for structural movement up to 150 percent of joint width.

D. Laytex Acyrilic Caulk: Elastoseal Latex manufactured by Pacific Polymers, or equal.

E. Silicon: One-part, primerless, paintable and highly flexible, shrink and stain resistant, as manufactured by U.S.C., or equal.

F. Custom colors may be required as determined by the architect.

2.02 BACK ROD

A. Materials: Open or expended polyurethane, open or closed cell as recommended by sealant manufacturer, compatible with sealant.

B. Non-Staining Primer: Type as recommended by manufacturer of sealant material.

C. Bond Breaker: Pressure sensitive adhesive polythlene tape.

D. Masking Tape: Pressure sensitive adhesive paper tape.

3.00 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer’s instructions.

C. Perform preparation in accordance with manufacturer’s instructions.

D. Protect elements surrounding the work of this section from damage or disfiguration.

E. Mask areas adjacent to joints.

3.03 PRODUCT USAGE

A. Exterior:

1. Horizontal Traffic Bearing Joints: Multi-part polyurethane, self-leveling type.

2. Exterior Vertical Joint: Multi-component, polysulfide type.

B. Interior:

1. Interior Static Joints: Solvent release acrylic type.

2. Ceramic Tile and Plumbing Fixture Conditions: One-part primerless silicone type.

C. Standard or custom colors to match adjacent work as required by architect.

D. Use only materials recommended by manufacturer for specific application.

E. Acoustical sealant shall be provided in, around and between building construction members such as framing, panel boxes, cutouts for penetrations of other materials or equipment, etc. where walls and floors and designed to be sound attenuated or acoustically treated.

F. Caulk around doors/windows, hollow metal frames where gypsum board inserts are behind the metal frame and hollow frame joints not fully welded interior and exterior.

G. All windows stops shall be set into clear sealant or the color sealant used to match the color of the window glass as selected by the architect.

H. Insure that all windowsills and door thresholds have a continuous bead of sealant interior and exterior applied for water/weather tightness.

I. Apply sealant around, at laps, and/or mitered corners of all exposed flashing, metal reveals, louvers, coping, etc. and color sealant used shall match color of adjacent color.

3.04 APPLICATION

A. Install backing material in joints using blunt instruments to avoid puncturing. Do not twist rod while installing. Install backing so that joint depth is 50 percent of joint width, but a minimum of 1/4 inch deep.

B. Install bond breaker where joint backing is not used.

C. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

D. Apply sealant in joints using pressure gun with nozzle cut to fit joint width. Make sure sealant is deposited in uniform, continuous beads without gaps or air pockets. Replace where gaps or air pockets occur.

E. Tool joints to required configuration within ten minutes of sealant application. If masking materials are used, remove immediately after tooling. Use an approved method of removing excess sealant where applies or where asked to have excess sealant removed by the Architect.

3.05 CLEANING

A. Remove excess materials adjacent to joints by mechanical means or with xylol (xylene) or mineral spirits as work progresses to eliminate evidence of spillage or damage of adjacent surfaces.

B. Leave finished work in neat, clean condition with no evidence of spill over onto adjacent surfaces.

C. All exposed sealants used shall be of a type that can receive any of all paint as specified under the painting section if required.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished installation under provision of Section 01655.

B. Protect sealants until cured.

END OF SECTION

SECTION 08 11 00
STEEL DOORS AND FRAMES

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

B. Principal Work in this Section:

1. Flush hollow metal doors.

2. Hollow metal doors frames.

3. Supplementary parts and components, such as inserts, clips, fasteners, anchors, and other miscellaneous supports and accessories required for a complete installation.

C. Work Installed but Furnished in Other Sections:

1. Finish Hardware - Section 08 71 00.

2. Fire-Resistant Glazing - Section 08 88 13

3. Painting – Section 09 90 00

D. Related Work:

1. Finish painting the work of this Section: Reference Section 09 90 00.

1.03 SUBMITTALS

A. Procedure: In compliance with Section 01300.

B. Shop Drawings: Include the following.

1. Door schedule indicating opening identification symbol, door and frame types, sizes, including thickness, swing, label requirements, vision panels, and undercuts.

2. Door and frame elevations, materials, construction, finish, anchoring for each wall condition, conditions of openings, vision panel sizes and locations, and accessories.

3. Location and size of reinforcement for finish hardware.

4. Locations of field splice joints, including associated details to assure proper assembly at Project site.

5. Identify work that cannot be permanently factory assembled before shipment.

6. Use same reference numbers for openings and details as shown on Contract Drawings.

C. Samples: Corner section of frame, approximately 8 in. long.

1.04 QUALITY ASSURANCE

A. Fire Resistance: Provide fire-rated door and frame assemblies bearing the label of a testing agency acceptable to the DSA for the fire resistance indicated.

1.05 HANDLING

A. Procedure: Comply with Section 01600.

B. Packing: Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

C. Delivery:

1. Inspect doors, frames, and accessories delivered to the site for damage. Unload and store, as specified, with a minimum of handling.

2. During delivery, provide temporary steel spreaders securely fastened to the bottom of each frame.
3. Replace doors and frames damaged before installation. Do not install damaged doors and frames.

D. Storage:

1. Store doors and frames carefully under cover. Provide a minimum of ½ in. space between doors. Do not stack doors and frames.

2. The storage spaces shall be dry and accessible, adequately ventilated and free from dust or water, and shall permit easy access for inspection and handling.

3. Do not use non-vented plastic or canvas shelters that create a humidity chamber.

4. If doors are shipped with fiberboard wrapper and it becomes wet, remove it immediately.

2.00 PRODUCTS

2.01 TYPE AND MANUFACTURE

A. Types: The following complying with SDI 100 , Recommended Specifications Standard Steel Doors and Frames, except as noted.

1. Hollow Metal Doors:

a. SDI Grade II, Model 2, seamless, (16 gage typical)l for doors up to 3 ft. wide, and Grade III, Model 2, seamless, (16 gage) for doors wider than 3

ft. Close the top of outswinging exterior doors with an inverted flush channel.

b. Provide exterior doors with a U factor of 0.24 BTU/hr. x sq. ft. x deg. F when tested in compliance with ASTM C 236.

2. Hollow Metal Door Frames: Fabricate of steel minimum for interior doors 16 gage and 12 gage for exterior doors, with corners reinforced, mitered, interlocked and / or welded, and faces continuously welded and ground smooth.

B. Manufacturer: One of the following.

1. Pacific Steel Products, Inc.

2. J-Door.

3. Krieger Steel Products Co.

4. Fenestra Corp.

5. Republic Builders Products.

6. Steelcraft Manufacturing Co.

2.02 MATERIALS

A. Hot-Rolled Steel Sheets and Strips: Commercial quality, Class 1 carbon steel, pickled and oiled, complying with ASTM A 366, A 568 and ASTM A 620.

B. Cold-Rolled Steel Sheets: Commercial quality, Class 1 carbon steel, complying with ASTM A 366 and ASTM A 568.

C. Galvanized Steel Sheets: Commercial quality, Class 1, zinc-coated carbon steel sheets complying with ASTM A 526, with ASTM A 525, A 60 zinc coating, mill phosphatized.

D. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize all items in exterior walls.

E. Paints:

1. Shop Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints complying with ANSI A224.1, "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames", and compatible with finish paint system specified in Section 09 90 00.

2. For Touch-Up of Damaged Galvanized Surfaces: SSPC Paint No. 20, Type II (Organic), by Tnemec, Porter International, Valspar Corp., Ameron Protective Coatings, or DuPont Co.

F. Door Filler: In compliance with SDI 100, except use UL listed materials in fire-rated doors.

2.03 FABRICATION

A. General:

1. Do not begin fabrication until the hardware schedule approved by the Architect and submitted by the hardware supplier has been received by the fabricator.

2. Fabricate work of this Section to required profiles by rollforming, brake-forming and welding to produce hollow metal work with straight and square edges, with surfaces free from wrap, wave, buckle, oil-canning and other defects.

3. Comply with SDI 100 and SDI 117, Manufacturing Tolerances Standard Steel Doors and Frames.

4. Conform to AWS standards for welding. Frames shall be face welded with exposed welds ground flush and smooth with parent metal.

5. Fabricate doors and frames at the following locations from galvanized steel; exterior walls, toilet rooms and shower rooms. Fabricate doors and frames at other locations from non-galvanized steel.

6. Locate hardware as recommended in Table V of SDI 100, except where ADA regulations are in conflict, in which case comply with ADA regulations.

7. Provide 16-gage reinforcement for pull plates and bars; through bolt are not permitted. Provide reinforcement for closers on all doorframes.

8. Except on weather-stripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.

9. Provide minimum 26 gage steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

B. Shop Priming:

1. After assembly, clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before painting. Grind welds and fabrication marks flush and smooth with parent metal. Fill depressions with metal filler before applying the shop primer. Apply one or more coats of epoxy mineral filler to conceal spot welds.

a. Acid-etch galvanized surfaces before pretreating.

b. Apply shop primer, within time limits recommended by pretreatment manufacturer, to provide a smooth coat of even consistency and to produce a dry film thickness of not less than 1-1/2 mil.

c. Doors with visible spot welds before or after application of finish paint will be unacceptable.

3.00 EXECUTION

3.01 INSPECTION

A. Inspect adjacent construction and supports.

B. Make sure that openings are within allowable tolerances, plumb, level, clean, will provide a solid anchoring surface, and that other conditions detrimental to the proper or timely completion of this work are corrected before proceeding with installation.

3.02 INSTALLING FRAMES

A. Set frames accurately in their scheduled locations, plumb, straight, square and rigid.

1. Comply with the Drawings and SDI 105, Recommended Erection Instructions for Steel Frames, these Specifications, the approved shop drawings and UL tested procedures for fire-rated openings; when in conflict, the most restrictive provision applies. Brace frames to prevent their displacement during erection of adjacent walls.

2. Refer to Section 03 30 00 for grouting anchors of rated frames.

3. Provide a minimum of 2 anchors for head of double doorframes.

4. Provide a minimum of 3 anchors per jamb for frame with doors under 81 in. high; provide one additional anchor for doors in frame over 81 in.

5. Attach jamb anchors to studs with a minimum of four 3/8 in. diameter self-tapping screws or bolts (2 per side).

B. Provide UL tested adjustable floor clips for all frames. Anchor clips to floor with powder-driven pins or bolts in expansion shields.

C. Leave frame spreader bars intact, wherever possible, until frames are set perfectly square and plumb and all anchors are securely attached and grouted where required.

3.03 HANGING DOORS

A. Install finish hardware in compliance with its manufacturer's templates and printed instructions.

B. Hang doors in compliance with their manufacturer's instructions, and adjust to the clearances specified in SDI publication 100, paragraph 2.2.1, except where more stringent clearances are indicated on the Drawings or required by UL listing for fire-rated doors.

C. Do not install doors warped, bowed, dented or otherwise damaged.

D. Adjust hardware so that doors operate freely for their entire travel, but not loosely, without sticking or hinge binding, with all hardware adjusted and functioning properly.

3.04 TOUCH-UP

A. Clean damaged primer, sand smooth, reclean and spot-prime with a paint compatible with the primer and the scheduled finish coats.

B. Before application of primer, touch-up galvanized surfaces with zinc-rich coating where zinc coating has been removed or damaged.

END OF SECTION

SECTION 08 20 00
WOOD DOORS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SCOPE: Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the Contract, including, but not limited to, these major items:

A. Solid Core Wood Doors.

B. U.L. Labeled Doors (where required).

C. Louvers (where indicated).

D. Provision for Glazing (where indicated).

1.03 RELATED WORK SPECIFIED ELSEWHERE AS REQUIRED

A. Furnishing and installing finish hardware – Section 08 71 00.

B. Door frames – Section 08 11 00.

C. Glazing – Section 08 80 00

D. Fire-Resistant Glazing- Section 08 88 13

E. Painting – Section 09 90 00

1.04 GENERAL REQUIREMENTS

A. Shop Drawings: Submit in accordance with Section 01300. Show locations and details of all cutouts.

B. Samples: In accordance with Section 01300, submit 8" samples of doors to receive transparent finish.

C. Storage: Store in clean dry spaces in a manner to prevent damage from any cause. Lay all doors flat, above the floor, on level supports.

D. Warranty: In accordance with General Conditions Division 0, submit written warranty, in approved form, that all defective materials or workmanship reported within a period of 2 years after final acceptance, will be promptly repaired or replaced to the satisfaction of the Owner. Cover the following items specifically.

1. Delamination in any degree.

2. Warp or twist of 1/4" or more.

3. Telegraphing of core unit through face veneer to cause surface variation of 1/100" in any 3" span.

4. Any defect which may affect performance or appearance.

E. Labeled Openings: Where labeled openings are scheduled or are required by codes, construct doors in accordance with the requirements of UL and attach labels of the indicated classification. Attach labels to the hinge jamb only.

F. Reference Standard: Provide materials and workmanship conforming to the Woodwork Institute of California "Manual of Millwork", Section 12 or 13 for Custom grade doors. Provide Certified Compliance grade stamp on every door.

G. Approved Manufacturers: Mohawk, General Veneer Co., Weyerhaeuser, or Curtis Door Division of Georgia-Pacific.

H. Reinforce tops of doors with steel edge protector.

2.00 PRODUCTS

2.01 SOLID CORE DOORS

A. Core: Kiln-dried, low density, 2 1/2" wide, random length wood blocks edge-glued with joints well staggered.

B. Cross Bands: 1/16" kiln-dried hardwood, full width of door, with grain perpendicular to face grain.

C. Edge Bands: Kiln-dried hardwood, not less than 5/8" thick after trimming. Stile bands of same species as face veneer.

D. Face Veneers: 1/28" thick kiln-dried Sound grade (Paint Grade) Beech or Birch, unselected for color where opaque finish is indicated; good grade Beech or Birch, uniform light or dark, for transparent finish. Exterior doors shall be factory finished medium density overlay - phenolic resin.

E. Glue: Use CS35 Type II for bonding core blocks; use Type I (fully waterproof) for all other work.

F. Acoustical Rating: STC 45

2.02 LABELED DOORS (Where Required)

A. Core: Fiber reinforced mineral, 22 lbs./c.f. density, except 20 minute label - see paragraph 2.01,A.

B. Cross-Bands, Edge-Bands and Face Veneers: As specified for solid core doors.

C. Construction and labels. Construct doors to meet UL requirements for the fire-rating label required. Affix UL label as required by the drawings. Fire assembly per NFPA A80

2.03 NON-LABELED DOORS

A. Solid lumber core staggered block core.

2.04 DOOR REINFORCEMENT

A. Reinforce tops of doors with steel edge protectors.

2.05 CUTOUTS (Where Required)

A. Openings for louvers and glass (where indicated): Fully frame cutouts in core prior to applying face veneers. Locate as indicated but not closer than 5” from any edge.

2.06 LOUVERS (Where Required)

A. Anemostat, Model AFDL, with vandal proof screws, or other as approved. Construct of 20 gauge cold-rolled steel. Labelled assemblies- Anemostat, Model FLDL-UL.

B. Finish: Factory applied rust-inhibitive prime coat.

3.00 EXECUTION

3.01 PREPARATION FOR SHIPMENT

A. Separators: Doors intended for opaque finish may be shipped in individual cartons or may be packaged in properly protected bundles with heavy separators between doors.

END OF SECTION

SECTION 08 31 00
ACCESS DOORS AND PANELS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Access doors and panels not provided by other trades but required for access to concealed equipment and assemblies.

B. Work Installed but Furnished in Other Sections:

1. Access doors and panels furnished by other trades.

C. Related Work:

1. Finish Painting Access Doors and Panels, Except Stainless Steel Surfaces: Reference Section 09 90 00.

2. Furnishing Access Doors and Panels as per Mechanical, Plumbing and Electrical Drawings

1.03 SUBMITTALS

A. Procedure: In accordance with Section 01300.

B. Manufacturer's Data: For access doors and panels, including compliance with Code requirements for those in fire-rated assemblies.

1. Supplement with shop drawings where required to show special installation conditions.

C. Closeout Submittals: Deliver keys properly tagged to District.

1.04 QUALITY ASSURANCE

A. All access doors and panels for the Project shall be made by the same manufacturer.

B. In fire-rated construction, provide fire-rated assemblies bearing the label of a testing agency acceptable to the Building Department for the fire resistance indicated.

2.00 PRODUCTS

2.01 ACCESS DOORS AND PANELS

A. One of the following trimless, prime-coated units, except where stainless steel is specified, equipped with flush, key-operated cam lock, or equal by Elmdor Manufacturing Co., Karp Associates, Inc., JL Industries or Milcor.

1. In Gypsum Board Surfaces, Except as Specified Below for Toilet Room Walls: Nystrom Type WB.

a. Material: Commercial grade cold-rolled steel with 16 gauge frame and 14 gauge door.

b. Finish Trim: 22 gauge steel drywall bead.

2. In Plaster Surfaces: Nystrom Type RP where the door is plastered; Type PW where door is painted.

a. Material: Commercial grade cold-rolled steel with 16 gauge frame and 14 gauge door.

b. Finish Trim: 22 gauge steel plaster bead with expanded metal lath.

3. Toilet Rooms Walls: Nystrom Type WB.

a. Material: Stainless steel, 16 gauge frame and 14 gauge door.

b. Finish Trim: 22 gauge steel drywall bead.

4. Fire-Rated Access Doors: Nystrom Type FRW or FRP as required by surrounding material.

a. Material: Commercial grade cold-rolled steel with 16 gauge frame and 20 gauge door.

b. Insulation: 2 in. thick fire-rated insulation sandwiched between two pieces of 20 gauge steel.

c. Finish Trim: 22 gauge steel drywall bead.

B. Size: Unless otherwise indicated on the Drawings, provide 24 in. square opening where a serviceman needs to enter the space accessible through the access door or panel; elsewhere not less than 12 in. square.

2.02 MATERIALS

A. General:

1. Provide sheet metal selected for its surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit.

2. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled metal sheet, stains, discoloration or other imperfections.

B. Galvanized Steel Sheet: ASTM A 526 (commercial quality), or ASTM A 527 (lock-forming quality), Coating Designation G90, mill phosphatized, stretcher leveled.

C. Steel Sheet: Commercial quality cold-rolled carbon steel sheet, stretcher-leveled, complying with the following requirements at the fabricator's option.

1. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591, with Class C zinc coating; chemically treated in mill with phosphate solution and light chromate rinse.

2. Uncoated Steel Sheet: ASTM A 366, Class I, matte finish.

D. Stainless Steel Sheet: ASTM A 167, Type 302 or 304, stretcher-leveled.

E. Hardware:

1. Hinges: Concealed spring hinges or concealed continuous piano hinge set to open 175 deg. For fire-rated units, provide self-closing mechanism.

2. Locking Device: Flush, screwdriver-operated cam lock of number required to hold door in flush, smooth plane when closed.

a. Where shown or scheduled, provide one cylinder lock per access door. Furnish 2 keys per lock. Key all locks alike, unless otherwise noted.

b. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

c. Where lock is provided, provide panel with interior latch mechanism to allow door to be opened from the inside without a key.

2.03 FABRICATION

A. Fabricate to profiles indicated without exposed cut edges. Produce flat, flush surfaces without cracking and grain separation at bends.

B. Continuously weld exposed joints and seams; grind, fill, and dress welds to produce smooth flush exposed surfaces in which welds are invisible after final finishing is completed.

C. Finish:

1. When installed in ceramic tile surfaces, provide stainless steel access panels finished with an AISI No. 4 (brushed) finish.

2. When installed in an exterior wall or soffit fabricate assemblies from commercial quality carbon steel sheets complying with ASTM A 526, hot-dip galvanized to comply with ASTM A 525, G 90, or hot-dip galvanize after fabrication to provide an equivalent zinc coating weight.

3. Elsewhere provide access panels with a baked-on rust-inhibitive primer.

3.00 EXECUTION

3.01 INSPECTION

A. Inspect adjacent construction and supports.

B. Make sure that openings are within allowable tolerances, plumb, level, clean, will provide a solid anchoring surface, and that other conditions detrimental to the proper or timely completion of this work are corrected before proceeding with installation.

3.02 INSTALLATION

A. Install at indicated locations, plumb, level, and square with adjacent construction.

1. Make sure that all openings are framed.

2. Attach securely to supports.

3. When installed in ceramic tile surfaces, coordinate panel location with the tilework so that the panel will align and fit within the tile module with no tile cutting, or a minimum of cutting.

B. Adjust hardware so that panels operate freely, but not loosely, without sticking or hinge binding, with hardware adjusted and functioning properly.

END OF SECTION

SECTION 08 33 15
ROLLING COUNTER FIRE SHUTTERS WITH FRAME

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

1. Automatic closing rolling counter fire doors with integral frame and countertop.

B. Related Sections:

1. Section 05 50 00 – Metal Fabrications.

2. Section 08 31 00 – Access Doors and Panels.

3. Section 08 71 00 – Door Hardware.

5. Section 09 22 16 – Non-Structural Metal Framing

6. Division 26. Electrical wiring and conduit for connection to alarm system.

1.03 SYSTEM DESCRIPTION

A. Performance Requirements:

1. All rolling counter fire doors shall be constructed in accordance with testing agency requirements and shall bear a 3/4 hour rating label.

1.04 SUBMITTALS

A. Reference Section 01300 – Submittal procedures; submit the following items:

1. Product Data.

2. Shop Drawings: Include special conditions not detailed in Product Data. Show interface with adjacent work.

3. Quality Assurance / Control Submittals:

a. Provide proof of manufacturer ISO 9001:2008 registration.

b. Provide proof of manufacturer and installer qualifications – see below.

c. Provide manufacturer's installation instructions.

4. Closeout Submittals:

a. Operation and Maintenance Manual.

b. Certificate stating that installed materials comply with this specification.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: ISO 9001:2008 registered and a minimum five years of experience in producing rolling counter fire doors with integral frames of the type specified.

2. Installer Qualifications: Manufacturer's approval.

1.06 DELIVERY, STORAGE AND HANDLING

A. Reference Section 01600 – Material, Equipment and Product Handling for product storage and handling requirements.

B. Follow manufacturer's instructions.

1.07 WARRANTY

A. Standard Warranty: Two (2) years from date of shipment against defects in material and workmanship.

B. Maintenance: Submit for owner's consideration and acceptance of a maintenance service agreement for installed products.

2.00 PRODUCTS

2.01 MANUFACTURER

A. Manufacturer:

1. Cookson: 24 Elmwood Avenue, Mountain Top, PA 18707.
Telephone (800) 233-8366.

a. Model: ERC20

2. Cornell

2.02 MATERIALS

A. Curtain:

1. Slat Configuration: Galvanized Steel with Finish - No. 10 (1-1/4" high by 3/8" deep) interconnected flat-faced slats constructed of 22 gauge, ASTM A 653, Commercial Quality, galvanized steel with tubular steel bottom bar measuring 2" high by 1-1/4" deep.

2. Finish: SpectraShield Coating System (color selected by Architect):

a. Zirconium treatment followed by baked-on polyester powder coat, with color as selected by Architect from manufacturer's standard color range, over 180 colors; minimum 2.5 mils (0.065 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better.

B. Endlocks: Fabricate continuous interlocking slat sections with high strength galvanized steel endlocks riveted to slat ends per UL requirements.

C. Head and Jamb Frame: Integral welded with guide groove incorporated into jamb design. Build to fit 5-inch wall thickness.

1. Stainless Steel: 16 gauge; type 304 #4 finish.

D. Countertop: Stainless Steel: 14 gauge; type 304 #4 finish.

E. Counterbalance Shaft Assembly:

1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inch per foot (2.5 mm per meter) of width.

2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door. Provide wheel for applying and adjusting spring torque.

F. Brackets: Fabricate from reinforced steel plate with bearings at rotating support points to support counterbalance shaft assembly and form end closures for hood.

G. Hood and Fascia: 16 gauge steel with reinforced top and bottom edges.

H. Smoke Seals & UL Smoke Label:

1. Bottom Bar: UL tested brush seal.

2. Guides and Head: Replaceable, UL Listed, brush seals sealing against fascia side of curtain.

2.03 OPERATION

A. FireGard Series Manual Push-Up Operation: Conventional spring tension release operating system.

1. Provide bottom bar lift handles and a pull-down pole with hook.

2. Activate automatic closure by melting of a fusible link.

3. Maintain automatic closure speed at an average of 6” – 24” per second.

4. Reset of spring tension, mechanical dropouts or release devices to be completed only by an approved and trained door systems technician.

5. Notify electrical contractor to supply and install the appropriate disconnect switch, all conduit and wiring per the door system wiring instructions.

6. Drop test and reset door system twice by all means of activation and comply fully with NFPA 80, Section 5.

2.04 ACCESSORIES

A. Locking:

1. Masterkeyable Cylinder Lock: Operable from coil both sides of bottom bar. Provide interlock switches on motor operated units.

a. Schlage

3.00 EXECUTION

3.01 EXAMINATION

A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.

B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

C. Commencement of work by installer is acceptance of substrate.

3.02 INSTALLATION

A. General: Install door unit and operating equipment with necessary hardware, anchors, inserts, hangers and supports.

B. Comply with NFPA 80 and follow manufacturer's installation instructions.

3.03 ADJUSTING

A. Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion.

3.04 FIELD QUALITY CONTROL

A. Site Test: Test doors for normal operation and automatic closing. Coordinate with authorities having jurisdiction to witness test and sign Drop Test Form.

3.05 CLEANING

A. Clean surfaces soiled by work as recommended by manufacturer.

B. Remove surplus materials and debris from the site.

3.06 DEMONSTRATION

A. Demonstrate proper operation to Owner's Representative.

B. Instruct Owner's Representative in maintenance procedures.

END OF SECTION

SECTION 08 41 13
ALUMINUM FRAMED ENTRANCE AND STOREFRONT

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

1. Aluminum-Framed Storefront.

a. Arcadia, Inc., AFG451 Series, 2” x 4-1/2”, Non-Thermal; offset glazed system, screw spline, shear block, compensating stick or punched opening fabrication for 1” glass (exterior). Storefront doors to be WS512T Series (wide stile) for 1” glass. Removable mullion by hardware supplier.

b. Arcadia, Inc. TC770 Series, 2-1/4” x 7-1/2” Non-Thermal; captured offset glazed, screw spline, shear block or punched opening fabrication for 1” glass (exterior). Storefront doors to be WS512T Series (style stile) for 1” glass. Removable mullion by hardware supplier.

c. Arcadia, Inc. AF450 Series, 2” x 4-1/2” Non-Thermal, Offset captured/Silicone vertical glazed, compensating stick or punched opening fabrication, 2-sided and 4-sided structural silicone for 1/4” fire-resistant glass (interior). Storefront doors to be WS512T (wide stile) for ¼” glass. Removable mullion by hardware supplier.

B. Related Sections:

1. Section 06 16 43 – Gypsum Sheathing

2. Section 07 42 13 – Metal Wall Panels

3. Section 07 62 00 – Sheet Metal Flashing and Trim

4. Section 07 92 00 – Joint Sealants

5. Section 08 32 13 – Sliding Aluminum-Framed Glass Doors

6. Section 08 51 13 – Aluminum Windows

7. Section 08 88 00 - Glazing

8. Section 09 22 16 – Non-Structural Metal Framing

9. Section 09 24 00 – Lath and Portland Cement Stucco

10. Section 09 94 00 – Fluorocarbon Resin Coating

1.03 REFERENCES

A. American Architectural Manufacturers Association (AAMA).

B. American Society for Testing and Materials (ASTM).

C. Aluminum Association (AA).

1.04 SYSTEM DESCRIPTION

A. General: In addition to requirements shown or specified, comply with:

1. Applicable provisions of AAMA Aluminum Storefront and Entrance Manual for design, materials, fabrication and installation of component parts.

B. Design Requirements:

1. Arcadia AFG451 Series is a framing system that provides for flush glazing on all sides without projected stops, with glass forward or inward of the frame. Framing system suitable for outside or inside glazing.

2. Arcadia TC770 Series is a framing system suitable for outside or inside glazing. Glass shall be forward of frame. Provides for two-color capability.

3. Arcadia AF450 Series is a framing system that provides for glass forward or inward of the frame. System suitable for outside or inside glazing, with optional structural silicone support at verticals. Provides for two-color capability.

C. Performance Requirements:

1. Limit air leakage through assembly to 0.06 CFM/min/sq.ft. (.00003 m^3/sm^2) of wall area at 6.24 PSF (300 Pa) as measured in accordance with ASTM E 283.

2. Water Resistance: No water leakage when measured in accordance with ASTM E 331 with a static test pressure of 8 PSF (383 Pa).

3. Limit mullion windload deflection of L/175 with full recovery of glazing materials, when measured in accordance with ASTM E 330.

4. System shall not deflect more than 1/8” at the center point, or 1/16” at the center point of a horizontal member, once deadload points have been established.

5. System shall accommodate expansion and contraction movement due to surface temperature differential of 180 degrees F.

6. Seismic testing shall conform to AAMA recommended static test method for evaluating performance of curtain walls and storefront wall systems due to horizontal displacements associated with seismic movements and building sway.

7. Thermal Performance - When tested in accordance with AAMA 1503.1, the following results should be attained: U-Maximum .63/CRF – minimum of 59.

8. National Fenestration Rating Council (NFRC) specific application evaluation.

1.05 QUALITY ASSURANCE

A. Single Source Responsibility:

1. Obtain entrances, storefronts, ribbon walls, window walls, curtain walls, window systems, and finish through one source from a single manufacturer.

B. Provide test reports from AAMA accredited laboratories certifying the performances as specified in 1.04.

1.06 WARRANTY

A. System shall be warranted against failure and/or deterioration of metals due to manufacturing process for a period of two (2) years.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Arcadia, Inc., 2301 East Vernon, Vernon, CA.
Telephone 323) 269-7300, Fax 323) 269-7390.

B. Acceptable Products:

1. Arcadia, Inc., AFG451 Series.

2. Arcadia, Inc., TC770 Series.

3. Arcadia, Inc., AF450 Series.

2.02 FRAMING MATERIALS AND ACCESSORIES

A. Framing Members, Transition Members, Mullions, Adaptors, and Mounting: Extruded 6063-T6 aluminum alloy (ASTM B 221 – Alloy G.S. 10a T6).

B. Screws, Fastening Devices, and Internal Components: Aluminum, stainless steel, or zinc-plated steel in accordance with ASTM A 164. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from aluminum.

C. Glazing Gasket:

1. Compression-type design, replaceable, molded or extruded, or ethylene propylene diene monomer (EPDM).

2. Shall be of type that locks securely into the glazing reglet to prevent glazing gaskets from disengaging.

2.03 FINISH

A. Finish all exposed areas of aluminum and components as indicated (excluding hardware):

1. An Architectural Class II or I anodic coating conforming with AA-M12C22A31/AA-M12C22A41.

a. Anodize finish color shall be Colornodic AC-2 (#11 Clear) or

b. Fluorocarbon Coating: AAMA 2605.

1) Resin: 70% PVDF Kynar 500/Hylar 5000.

2) Substrate: Cleaned and pretreated with chromium phosphate.

3) Primer: Manufacturer’s standard resin base compatible coating. Dry film thickness.

a) Extrusion: Minimum 0.20 mil.

4) Color Coat: 70% PVDF, dry film thickness.

a) Extrusion: 1.0 mil.

5) Color: #36 Anodic Clear.

6) Acceptable Coatings Manufacturers:

a) PPG Industries, Inc.

2.04 SYSTEM FABRICATION

A. Continuous sub-sill shall be provided under sill members to collect water infiltration and divert from the interior of the system.

B. Framing members shall be internally reinforced and secured at head and sill as necessary for structural performance requirements, for hardware attachment, and as indicated.

C. Fasteners shall be so located as to ensure concealment from view in the final assembly.

3.00 EXECUTION

3.01 EXAMINATIONS

A. Examine conditions and verify substrate conditions are acceptable for product installation.

3.02 INSTALLATION

A. Install in accordance with approved shop drawings and manufacturer's installation instructions.

3.03 FIELD QUALITY CONTROL

A. Test the storefront for water leaks in accordance with AAMA 501.2. Conduct test in the presence of the Architect. Correct deficiencies observed as a result of this test.

END OF SECTION

SECTION 08 51 13
ALUMINUM WINDOWS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

1. Sliding Window.

B. Related Sections:

1. Section 06 16 43 – Gypsum Sheathing.
2. Section 07 42 13 – Metal Wall Panels.
3. Section 07 62 00 – Sheet Metal Flashing and Trim.
4. Section 07 90 00 – Joint Sealers.
5. Section 08 41 13 – Aluminum-Framed Entrances and Storefronts.
6. Section 08 88 00 - Glazing
7. Section 09 22 16 – Non-Structural Metal Framing.
8. Section 09 24 00 – Lath and Portland Cement Stucco.
9. Section 09 94 00 – Fluorocarbon Resin Coating.

1.03 REFERENCES

A. American Architectural Manufacturers Association (AAMA).

B. American Society for Testing and Materials (ASTM).

C. Aluminum Association (AA).

1.04 SYSTEM DESCRIPTION

A. General: In addition to requirements shown or specified, comply with:

1. Applicable provisions of AAMA Aluminum Storefront and Entrance Manual for design, materials, fabrication and installation of component parts.

B. Design Requirements: Arcadia 2820 Pass Thru Series Multislide is a single source package of window, window frame and hardware that is engineered to allow multi-slide parallel stacking.

C. Performance Requirements: Each assembly shall be tested by a recognized testing laboratory or agency in accordance with specified test methods.

1. Resistance to corner racking shall be tested by the dual moment corner joint strength test.

2. Structural uniform load shall be tested in accordance with ASTM E 330.

3. The 2820 Pass Thru Series Sliding Window incorporate an integral pan with a 3/4-inch high water barrier to eliminate the possibility of leakage per AAMA 501.2.

1.05 QUALITY ASSURANCE

A. Single Source Responsibility:

1. Obtain entrances, storefronts, ribbon walls, window walls, curtain walls, window systems, and finish through one source from a single manufacturer.

B. Provide test reports from AAMA accredited laboratories certifying the performances as specified in 1.04.

1.06 WARRANTY

A. System shall be warranted against failure and/or deterioration of metals due to manufacturing process for a period of two (2) years.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Arcadia Architectural Products, Inc., 3225 East Washington Blvd., Vernon, CA. Telephone 323) 269-7300, fax 323) 269-7390.

B. Acceptable Products:

1. Arcadia, Inc., 2820 Pass Thru Series Multislide, 1-3/4 inches.

a. Vertical Stile: 2, 3-1/2 or 5 inches.

b. Top Rail: 2-1/16 or 3-5/8 or 5-1/8 inches.

c. Bottom Rail: 3 or 6 or 10 inches.

d. Glazing Insert: Snap-in type for 1/4 inch fire-resistance.

2. Major portions of the window stiles shall be a nominal .125 inch and glass stops shall be .050 inch thick.

2.02 MATERIALS AND ACCESSORIES

A. Windows Members: Extruded 6063-T6 aluminum alloy (ASTM B 221 – Alloy G.S. 10aT5).

B. Screws, Fastening Devices, and Internal Components: Aluminum, stainless steel, or zinc-plated steel in accordance with ASTM A-164 shall be aluminum or steel, providing the steel is properly isolated from aluminum.

C. Glazing Gasket: Compression-type design.

2.03 HARDWARE

A. Hardware for 2820 Pass Thru Series Multislide shall be furnished and installed by the manufacturer and shall include the following standard hardware:

1. Weatherstripping: A hard-backed polypile weatherstrip shall be installed in frame and interlockers and meeting stiles of bi-parting panels. Sliding panel supplied with double sweep at sill.

2. Sill Track: Stainless steel cap.

3. Tandem ball bearing caster.

4. Adams Rite maximum security lock.

5. Cylinders (interior and exterior).

6. Flush face pull.

2.04 FINISH

A. Finish all exposed areas of aluminum and components as indicated:

1. An Architectural Class II or I anodic coating conforming with AA-M12C22A31/AA-M12C22A41.

a. Anodize finish color shall be Colornodic AC-2 (#11 Clear) or Fluorocarbon Coating AAMA 2605.2.

1) Resin: 70% PVDF Kynar 500/Hylar 5000.

2) Substrate: Cleaned and pretreated with chromium phosphate.

3) Primer: Manufacturer's standard resin base compatible coating. Dry film thickness.

(a) Extrusion: Minimum 0.20 mil.

4) Color Coat: 70% PVDF, dry film thickness.

(a) Extrusion: 1.0 mil.

5) Color: #36 Anodic Clear.

6) Acceptable Coatings Manufacturers:

(a) PPG Industries, Inc.

2.05 WINDOW FABRICATION

A. Stiles and rails shall be tubular sections accurately joined, flush and hairline at corners with heavy concealed reinforcement brackets secured with machine bolts, with optional MIG weld. Exposed screws not permitted.

B. Prepare internal reinforcement for hardware.

C. Custom hardware templates and physical hardware must be submitted prior to any fabrication.

3.00 EXECUTION

3.01 EXAMINATIONS

A. Examine conditions and verify substrate conditions are acceptable for product installation.

3.02 INSTALLATION

A. Install in accordance with approved shop drawings and manufacturer's installation instructions.

3.03 FIELD QUALITY CONTROL

A. Contractor's responsibility to make all necessary final adjustments to attain normal operation of each window and its mechanical hardware.

END OF SECTION

SECTION 08 51 23
STEEL WINDOWS

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:
   1. Fire Rated/Blast – Steel Fixed/Sliding/Single Hung Window.

B. Related Sections:
   1. Metal Fabrications: Section 05 50 00
   2. Joint Sealers: Section 07 90 00
   3. Fire Resistant Glazing: Section 08 88 13

1.2 REFERENCES

A. United Facilities Criteria (UFC) DOD Minimum Antiterrorism Standards for Buildings.
B. US General Services Administration (GSA) Test Protocol for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.
C. Underwriters Laboratories Inc. (UL).
D. American Architectural Manufacturers Association (AAMA).
E. American Society for Testing and Materials (ASTM).
F. Steel Window Institute (SWI).

1.3 SYSTEM DESCRIPTION

A. General: In addition to requirements shown or specified, comply with:
   1. Meet or exceed the Steel Window Institute (SWI) Specifications as indicated and/or modified by the specifications herein.
B. Design Requirements: Arcadia STL362 Series Steel Window is a Fire Rated/Blast Window.
C. Performance Requirements:
   1. Blast Mitigation: Accordance with DoD Antiterrorism Construction Standard UFC 4-010-01 for “Low” or “Medium” level of protection at 82’ setback with explosive 2. Anchor and structural calculations must be signed by a licensed Professional Engineer.
      Or
   2. Accordance with US General Services Administration (GSA) Test Protocol GSA-TS01-2003, level 2 protection for design blast load of up to 10 psi peak applied pressure and 110 psi-msec. applied impulse. This test report will be accepted in lieu of calculations.
   3. Fire Rating: 45/60 Minute fire rated UL tested in accordance with NFPA 80 and NFPA 257.
   4. Life Safety Criteria: windows shall conform to NFPA 101 Life Safety Code when rescue and/or second means of escape are indicated.
   5. Air Infiltration Test: ASTM E283 – Maximum air infiltration 0.37 CFM per square foot with a pressure differential of 6.24 PSF (50 MPH).
   6. Water Penetration Test: No water penetration for 15 minutes when the window is subjected to rate of flow of 5 Gal./Hr./Sq. Ft. with pressure differential of 2.9.
   7. C30 Structural Rated.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility:
   1. Obtain entrances, storefronts, ribbon walls, window walls, curtain walls, window systems, and finish through one source from a single manufacturer.
   2. Provide test reports from AAMA accredited laboratories certifying the performances as specified in 1.3.

3. Submit shop drawings showing window and installation details, including anchorage, fastening and recommended sealing methods. Show dimensioned elevations with opening and window sizes. Upon request, provide test reports for all pertinent standards.
4. Submit samples of anchors, fasteners, hardware, assembled corner sections and other materials and components as requested by Architect.

1.5 WARRANTY

A. System shall be warranted against failure and/or deterioration of metals due to manufacturing process for a period of two (2) years.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Arcadia, Inc., 2301 E. Vernon, Vernon, CA. Telephone (323)269-7390, Fax (323)269-7300.
B. Acceptable Products:
   1. Arcadia, Inc., STL362 Series Steel Window (Fire Rated/Blast).

2.2 FRAMING MATERIALS AND ACCESSORIES

A. The frame and ventilator shall be composed of galvaneal steel sheet, Commercial Quality, complying with ASTM A526, chemically treated, extra smooth, not oiled, and coated in accordance with ASTM A525, G60 designated, all spangles wiped free.
B. Structural Tubing: ASTM A500, Cold Formed, Welded Seamless Carbon Steel, in Rounds & Shapes.
C. The frame and ventilator sections shall have a front to back depth dimension of 3 5/8” and be a minimum thickness of 16 gauge.
D. Ventilators shall be double weatherstripped, weatherstripping shall be close cell neoprene, extruded vinyl or EPDM.
E. Hardware shall be as follows:
   1. Self-Closing Hardware.
   2. 165 Degree Fusible Link.
   3. Self-closing.
   4. Optional electronic actuated closure.
F. Glazing:
   1. Provide in general accordance with Section 08 88 13.
   2. Glazing method shall be in general accordance with the GANA Glazing Manual for specified glass type, or as approved by the glass fabricator.
G. Glazing Materials:
   1. Setting Blocks/Edge Blocking: Provide in sizes and locations recommended by GANA Glazing Manual.
   2. Expanded Cellular Glazing Tapes shall meet AAMA 800.
   3. Structural Silicone shall meet ASTM C 1184.
   4. Spacer tape in continuous contact with structural silicone shall meet AAMA 800.
I. Screen:
   1. Screens made of extruded aluminum frame and screened with fiber mesh.

2.3 FINISH

A. Primer Coat: Factory painted standard primer coat.
B. Finish Coat: Electrostatically applied factory coated with baked alkyd enamel.
C. Colors to be selected by architect.

2.4 SYSTEM FABRICATION

A. All frame joists, mounting fins and integral mullions are to be welded utilizing true-penetration MIG weld. Oversized windows and combination window sets are to be joined with interlocking mullions for superior strength.
B Framing members shall be internally reinforced and secured at head and sill as necessary for structural performance requirements, for hardware attachment, and as indicated.
C. Fasteners shall be so located as to ensure concealment from view in the final assembly.

PART 3 – EXECUTION

3.1 EXAMINATIONS

A. Examine conditions and verify substrate conditions are acceptable for product installation.

3.2 INSTALLATION

A. Install in accordance with approved shop drawings and manufacturers installation instructions.

3.3 FIELD QUALITY CONTROL

A. Test the windows for water leaks in accordance with AAMA 501.2. Conduct test in the presence of the Architect. Correct deficiencies observed as a result of this test.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.
3. Division 08 Section “Clad Wood Doors”.
4. Division 08 Section “Stile and Rail Wood Doors”.
5. Division 08 Section “Sound Control Hollow Metal Door Assemblies”.
6. Division 08 Section “Sound Control Wood Door Assemblies”.
7. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.

4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

a. Type, style, function, size, label, hand, and finish of each door hardware item.
b. Manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
e. Explanation of abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for door hardware.
g. Door and frame sizes and materials.
h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
b. Complete (risers, point-to-point) access control system block wiring diagrams.
c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Proof of Compliance: (California located Projects): Provide a list of product(s) containing chemicals known to cause cancer or reproductive toxicity as defined by the Office of Environmental Health Hazard Assessment (OEHHA) under Proposition 65 (CA Code of Regulations, Title 27, Section 27001). The list includes the specific chemical(s), if the chemical will be exposed to consumers, the means of warning, and an illustration of the label.

F. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

G. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

F. California Building Code: Provide hardware that complies with CBC Section 11B.

1. All openings as a part of an accessible route shall comply with CBC Section 11B-404.

2. The clear opening width for a door shall be 32" minimum. For a swinging door it shall be measured between the face of the door and the stop, with the door open 90 degrees. There shall be no projections into it below 34" and 4" maximum projections into it between 34" and 80" above the finish floor or ground. Door closers and stops shall be permitted to be 78" minimum above the finish floor or ground. CBC Section 11B-404.2.3.

3. Operable hardware on accessible doors shall comply with CBC Section 11B-309.4 and shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. Operable parts of such hardware shall be 34" minimum and 44" maximum above finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides.

4. Hardware (including panic hardware) shall not be provided with "nightlatch" function for any accessible doors or gates unless the following conditions are met:

   a. Such hardware has a 'dogging' feature and is dogged during the time the facility is open.
   b. All 'dogging' operation is performed only by employees as their job function (non-public use).

5. The force for pushing or pulling open a door shall be in accordance with CBC Section 11B-404.2.9.

   a. Interior hinged doors, sliding or folding doors, and exterior hinged doors: 5 pounds (22.2 N) maximum. Required fire doors: the minimum opening force allowable by the DSA authority, not to exceed 15 pounds (66.7N). These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.
   b. The force required for activating any operable parts, such as lever hardware, or disengaging other devices shall be 5 pounds (22.2N) maximum to comply with CBC Section 11B-309.4.
   c. The 5 pound (22.2 N) maximum force shall be validated for the size of the door used. The Building Materials Listing of the California State Fire Marshal shall indicate that the door hardware meets the 5 pound (22.2 N) force and shall also list the largest door that can be used.

6. Door closing speed shall comply with CBC Section 11B-404.2.8. Closers shall be adjusted so that the required time to move a door from an open position of 90 degrees to a position of 12 degrees from the latch is 5 seconds minimum. Spring hinges shall be adjusted so that the required time to move a door from an open position of 70 degrees to the closed position is 1.5 seconds minimum.

7. Floor stops shall not be located in the path of travel and 4" maximum from walls.

8. Thresholds shall comply with CBC Section 11B-404.2.5.

G. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

H. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

I. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

J. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

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

2.2 HANGING DEVICES

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

1. Quantity: Provide the following hinge quantity:

   a. Two Hinges: For doors with heights up to 60 inches.
   b. Three Hinges: For doors with heights 61 to 90 inches.
   c. Four Hinges: For doors with heights 91 to 120 inches.
   d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

   a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
   b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

   a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
   b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

   a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

   a. Hager Companies (HA) - AB Series, 2 knuckle.
   b. McKinney (MK) - TA Series. 2 knuckle.
   c. No Substitution.

6. Manufacturers:

   a. Hager Companies (HA) - AB Series, 3 knuckle.
   b. Ives (IV) - 3CB Series, 3 knuckle.
   c. McKinney (MK) - TA Series, 3 knuckle.
   d. dormakaba Best (ST) - CB Series, 3 knuckle.
   e. No Substitution.

7. Manufacturers:

   a. Hager Companies (HA) - BB Series, 5 knuckle.
   b. Ives (IV) - 5BB Series, 5 knuckle.
   c. McKinney (MK) - TA/T4A Series, 5 knuckle.
   d. dormakaba Best (ST) - F/FBB Series, 5 knuckle.
   e. No Substitution.

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Where specified, provide modular continuous geared hinges that ship in two or three pieces and form a single continuous hinge upon installation.

2. Manufacturers:.

a. Pemko (PE).
b. Select Hinges (SL).

C. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 Grade 1-600 pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR).
b. Pemko (PE).

D. Floor Closers (Heavy Duty, Offset Hung, Single Acting): Provide ANSI/BHMA A156.4 Grade 1 Certified Products Directory (CPD) listed floor closers available for fire rated openings up to 3-hour assemblies to accommodate a door width up to 48” and weight up to 450 pounds with the top pivot included. Floor closers shall be available in non-hold open or selective hold open with a built-in positive dead stop that prevents they door from swinging beyond the desired opening degree and shall have separate and independent valves for closing speed, latch speed and backcheck. Floor closers shall have a 10-year warranty.

1. Provide optional features as specified:

a. Delayed action (non-hold open closers only).
b. Cold weather fluid (not available for closers with delayed action).
c. Sealed closer.
d. Lead lined for use with openings up to 1500 pounds; provided with lead lined top and bottom pivots.
e. Models that meet ICC/ANSI A117.1 for low opening force requirements.

2. Manufacturers:

a. Norton Rixson (RF) - 27 Series.
b. No Substitution.

E. Floor Closers (Standard Duty, Offset Hung, Single Acting): Provide floor closers available for fire rated openings up to 3-hour assemblies to accommodate a door width up to 36” and weight up to 200 pounds with the top pivot included. Floor closers shall have a single valve for adjusting closing speed with a built-in hydraulic backcheck. Floor closers shall have a 10-year warranty.

1. Provide optional features as specified:

a. Models that meet ICC/ANSI A117.1 for low opening force requirements.

2. Manufacturers:

a. Norton Rixson (RF) - 20 Series.
b. No Substitution.

F. Floor Closers (Heavy Duty, Center Hung, Single Acting): ANSI/BHMA A156.4 Grade 1 Certified Products Directory (CPD) listed floor closers to accommodate a door width up to 48” and weight up to 350 pounds standard and 1000 pounds when specified with the top pivot included. Floors closers shall be available in non-hold open or selective hold open with a built-in positive dead stop prevents door from swinging beyond the desired opening degree and have separate and independent valves for closing speed, latch speed and backcheck. Floor closers shall have a 10-year warranty.

1. Provide optional features as specified:

a. Delayed action (non-hold open closers only).
b. Cold weather fluid (not available for closers with delayed action).
c. Sealed closer.
d. Models that meet ICC/ANSI A117.1 for low opening force requirements.

2. Manufacturers:

a. Norton Rixson (RF) - 28 Series.
b. No Substitution.

G. Floor Closers (Heavy Duty, Center Hung, Double Acting): Provide floor closers to accommodate a door width up to 48” and weight up to 300 pounds standard and 1000 pounds when specified with the top pivot included. Floor closers shall be available in non-hold open or automatic hold open with adjustable closing speed valves for each direction of door swing. Floor closers shall have a 10-year warranty.

1. Provide optional features as specified:

a. Cold weather fluid available.
b. Sealed closer.
c. Models available to meet ICC/ANSI A117.1 low opening force requirements.

2. Manufacturers:

a. dormakaba (DO) - BTS80 Series.
b. Norton Rixson (RF) - 40 Series.
c. No Substitution.

H. Floor Closers (Standard Duty, Center Hung, Double Acting): Provide floor closer to accommodate a door width up to 48” and weight up to 200 pounds with the top pivot included. Floor closers shall be available in non-hold open or automatic hold open with adjustable closing speed valves for each direction of door swing. Floor closers shall have a 10-year warranty.

1. Provide optional features as specified:

a. Cold weather fluid available.
b. Sealed closer.

2. Manufacturers:

a. dormakaba (DO) - BTS80 Series.
b. Norton Rixson (RF) - 30 Series.
c. No Substitution.

I. Floor Closers (Heavy Duty, Independently Hung, Single Acting): Provide floor closers available for fire rated openings up to 3-hour assemblies to accommodate a door width up to 48” and weight up to 250 pounds for use on doors independently hung with butt hinges, pocket pivots, or continuous hinges. Floor closers shall have separate and independent valves for closing speed, latch speed and backcheck. Floor closers shall have a 10-year warranty.

1. Provide optional features as specified:

a. Cold weather fluid available.
b. Sealed closer.

2. Manufacturers:

a. Norton Rixson (RF) - F327 Series.
b. No Substitution.

J. Floor Closers (Shallow Depth, Offset Hung, Single Acting): Provide floor closers available for fire rated openings up to 3-hour assemblies to accommodate a door width up to 48” and weight up to 250 pounds with the top pivot included. Floor closers shall be available non-hold open or automatic hold open with separate and independent valves for closing speed, latch speed and backcheck. Floor closers shall have a 2-year warranty.

1. Provide optional features as specified:

a. Delayed action (non-hold open closers only).

2. Manufacturers:

a. Norton Rixson (RF) - 51 Series.
b. No Substitution.

K. Floor Closers (Shallow Depth, Center Hung, Single Acting): Provide floor closers to accommodate a door width up to 48” and weight up to 250 pounds with the top and pivot included. Floor closers shall fit within a 2” maximum floor depth and be available non-hold open or automatic hold open with separate and independent valves for closing speed, latch speed and backcheck. Floor closers shall have a 2-year warranty.

1. Provide optional features as specified:

a. Delayed action (non-hold open closers only).

2. Manufacturers:

a. Norton Rixson (RF) - 50 Series.
b. No Substitution.

L. Floor Closers (Shallow Depth, Center Hung, Double Acting): Provide floor closers to accommodate a door width up to 48” and weight up to 250 pounds with the top and pivot included. Floor closers shall fit within a 2” maximum floor depth and be available non-hold open

or automatic hold open with separate and independent valves for closing speed, latch speed and backcheck. Floor closers shall have a 2-year warranty.

1. Provide optional features as specified:

   a. Delayed action (non-hold open closers only).

2. Manufacturers:

   a. Norton Rixson (RF) - 5020 Series.
   b. No Substitution.

M. Floor Closers (Shallow Depth, Independently Hung, Single Acting): Provide floor closers available for fire rated openings up to 3-hour assemblies to accommodate a door width up to 48” and weight up to 250 pounds for use on doors independently hung with butt hinges, pocket pivots, or continuous hinges. Floor closers shall fit within a 2” maximum floor depth and have separate and independent valves for closing speed, latch speed and backcheck. Floor closers shall have a 2-year warranty.

1. Manufacturers:

   a. Norton Rixson (RF) - F53 Series.
   b. No Substitution.

N. Security Floor Closers (Heavy Duty, Offset Hung, Single Acting): Provide floor closers available for fire rated openings up to 3-hour assemblies to accommodate a door width up to 48” and weight up to 650 pounds with the top pivot included. Floor closers shall be sealed standard with a heavy-duty forged arm, adjustable closing speed and be furnished standard with Torx screws. Floor closers shall have a 10-year warranty.

1. Manufacturers:

   a. Norton Rixson (RF) - SEC27-180 Series.
   b. No Substitution.

2.3 POWER TRANSFER DEVICES

A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

   a. Pemko (PE) - EL-CEPT Series.
   b. Securitron (SU) - EL-CEPT Series.
   c. Von Duprin (VD) - EPT-10 Series.

B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide

sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:

   a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
   b. McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

   a. Hager Companies (HA) - Quick Connect.
   b. McKinney (MK) - QC-C Series.
   c. Dormakaba Best (ST) - WH Series.

2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:

   a. Door Controls International (DC).
   b. Rockwood (RO).
   c. Trimco (TC).

B. Coordinators: ANSI/BHMA A156.3 door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

   a. Door Controls International (DC).
   b. Rockwood (RO).
   c. Trimco (TC).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.

3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls, where applicable, shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

6. Manufacturers:

   a. Hiawatha, Inc. (HI).
   b. Rockwood (RO).
   c. Trimco (TC).

2.5 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Manufacturer’s Standard.

C. Large Format Interchangeable Cores: Provide removable cores (LFIC) as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.

D. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key cylinders to match Owner's existing system.

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

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

F. Construction Keying: Provide construction master keyed cylinders.

G. Key Registration List (Bitting List):

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

2.6 KEY CONTROL

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

1. Manufacturers:

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

2.7 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Heavy duty mortise locks shall have a ten-year warranty.

2. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 16 million cycles or greater.

3. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 12.3 million cycles or greater.

4. Manufacturers:

a. Corbin Russwin Hardware (RU) - ML2000 Series.
b. Sargent Manufacturing (SA) - 8200 Series.

2.8 ELECTROMECHANICAL LOCKING DEVICES

A. Electromechanical Mortise Locksets, Grade 1 (Commercial Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed, subject to same compliance standards and requirements as mechanical mortise locksets, electrified locksets to be of type and design as specified below.

1. Electrified Lock Options: Where indicated in the Hardware Sets, provide electrified options including: outside door lock/unlock trim control, latchbolt and lock/unlock status monitoring, deadbolt monitoring, and request-to-exit signaling. Support end-of-line resistors contained within the lock case. Unless otherwise indicated, provide electrified locksets standard as fail secure.
2. Manufacturers:

B. Electromechanical Multi-Point Locks: Vertical rod locking devices designed for openings requiring multiple latching points within one locking mechanism. Rods are retracted by dual mounted outside lever trim controls available in a variety of ANSI/BHMA operational functions. Option for single top latching only eliminates the need for bottom strikes. Electromechanical options include solenoid activated trim, electric latch retraction, and inside and outside lever monitoring.

1. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.

2. Manufacturers:

a. Corbin Russwin Hardware (RU) MP9800 Series.
b. Sargent Manufacturing (SA) - 7000 Series.

2.9 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.10 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.

2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

   a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
   b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.

9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

10. Rail Sizing: Provide exit device rails factory sized for proper door width application.

11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

   1. Extended cycle test: Exit devices to have been cycle tested in ordinance with ANSI/BHMA 156.3 requirements to 5 million cycles or greater.

   2. Manufacturers:

      a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
      b. Sargent Manufacturing (SA) - 80 Series.

2.11 ELECTROMECHANICAL EXIT DEVICES

A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.

   1. Energy Efficient Design: Provide devices which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.

2. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.

3. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.

4. Manufacturers:

   a. Corbin Russwin Hardware (RU) - ED5000 Series.
   b. Sargent Manufacturing (SA) - 80 Series.

2.12 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.

2. Manufacturers:

   a. Corbin Russwin Hardware (RU) - DC6000 Series.
   b. Norton Rixson (NO) - 7500 Series.
   c. Sargent Manufacturing (SA) - 1431 Series
   d. Sargent Manufacturing (SA) - 351 Series.

2.13 SURFACE MOUNTED CLOSER HOLDERS

A. Electromagnetic Door Holders: ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate.12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.

1. Manufacturers:

a. Norton Rixson (RF) - 980/990 Series.
b. Sargent Manufacturing (SA) - 1560 Series.

2.14 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:

a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Manufacturers:

a. Hiawatha, Inc. (HI).
b. Rockwood (RO).

2.15 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

   a. Hiawatha, Inc. (HI).
   b. Rockwood (RO).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

   1. Manufacturers:

      a. Norton Rixson (RF).
      b. Rockwood (RO).
      c. Sargent Manufacturing (SA).

2.16 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

   1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

   1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

   1. Pemko (PE).
   2. Reese Enterprises, Inc. (RE).

2.17 ELECTRONIC ACCESSORIES

A. Switching Power Supplies: Provide power supplies with either single or dual voltage configurations at 12 or 24VDC. Power supplies shall have battery backup function with an integrated battery charging circuit and shall provide capability for power distribution, direct lock control and Fire Alarm Interface (FAI) through add on modules. Power supplies shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs.

1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

2. Manufacturers:

a. Securitron (SU) - AQD Series.

B. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.

1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

2. Manufacturers:

a. Securitron (SU) - AQL Series.

2.18 FABRICATION

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

2.19 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

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

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

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

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect and are based on updated Floor plan & Door schedule dated 03/22/2023. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

Hardware Sets

Set: 1.0

Doors: A101A, A107, M120A, M120D, M121A, M121D

Description: (ACCESS CONTROL) EXTERIOR ALUM. PAIR

2	Continuous Hinge - Power Transfer Prep	CFM HD1 PT		PE	
1	Concealed Vert Rod Exit, Nightlatch	(12) 43 5CH 53 55 56 AD8410 106 x 525	US32D	SA	⚡
1	Concealed Vert Rod Exit, Exit Only	(12) 43 5CH 53 55 56 AD8410 EO x 525	US32D	SA	⚡
1	Rim Cylinder	Match Facility Standard	626		
2	Offset Door Pull	RM3311-12	US32D	RO	
2	Conc Overhead Stop (Alum storefront)	6-X36 (in lieu of a Door Stop)	630	RF	
2	Surface Closer	351 P10	EN	SA	
2	Drop Plate	as required	EN	SA	
2	Door Stop	466-RKW	Black	RO	
1	Threshold	158A or per Sill Detail		PE	
1	Rain Guard	346C (Omit @ overhang)		PE	
1	Gasketing/Seals	by Door Mfg.		OT	
2	Sweep	315CN		PE	
2	Meeting Astragal Set	18041CSB		PE	
2	ElectroLynx Frame Harness	QC-C1500P		MK	⚡
2	ElectroLynx Door Harness	QC-C__P		MK	⚡
1	Card Reader	TBD - by Owner		OT	
1	Power Supply w/ Power Distribution Board	AQL Series-R8E1 as required		SU	⚡
2	Electric Power Transfer	EL-CEPT		SU	⚡

Notes: Card Reader and wiring to electrified hardware by Security Contractor.

Set: 2.0

Doors: A101B, A101C
Description: EXTERIOR ALUM. (PAIR)

2	Continuous Hinge	CFM HD1		PE
1	Concealed Vert Rod Exit, Nightlatch	16 43 5CH AD8410 106 x 525	US32D	SA
1	Concealed Vert Rod Exit, Exit Only	16 43 5CH AD8410 EO x 525	US32D	SA
1	Rim Cylinder	Match Facility Standard	626	
2	Mortise Cylinder	@ Cyl. Dogging - Match Facilty Standard	626	OT
2	Conc Overhead Stop (Alum storefront)	6-X36 (in lieu of a Door Stop)	630	RF
2	Surface Closer	351 P10	EN	SA
2	Drop Plate	as required	EN	SA
1	Threshold	171A or Per Sill Detail		PE
1	Gasketing/Seals	by Door Mfg.		OT
2	Sweep	18062CNB		PE

Set: 3.0

Doors: M102
Description: EXTERIOR STAGE (PAIR)

2	Continuous Hinge	FM300 WEP	630	MR
1	Concealed Vert Rod Exit, Nightlatch	16 43 5CH MD8610 106 x 525	US32D	SA
1	Concealed Vert Rod Exit, Exit Only	16 43 5CH MD8610 EO x 525	US32D	SA
1	Rim Cylinder	Match Facility Standard	626	
2	Mortise Cylinder	@ Cyl. Dogging - Match Facilty Standard	626	OT
1	Vandal Resistant Trim	VRT26 C	US32D	RO
1	Vandal Resistant Trim	VRT26	US32D	RO
2	Surface Closer	351 P10	EN	SA
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
2	Door Stop	466-RKW	Black	RO
1	Threshold	158A or per Sill Detail		PE
1	Gasketing (Head)	2891AS		PE
2	Gasketing (Jambs)	290AS		PE
1	Rain Guard	346C (Omit @ overhang)		PE
2	Sweep	315CN		PE

Set: 4.0

Doors: M108
Description: EXTERIOR ELECTRICAL (PAIR)

2	Continuous Hinge	FM300 WEP	630	MR
1	Removable Mullion	12-L980	PC	SA
1	Rim Exit Device, Storeroom	12 43 5CH 8804 Less Pull x 525	US32D	SA
1	Rim Exit Device, Exit Only	12 43 5CH 8810 EO x 525	US32D	SA
1	Rim Cylinder	Match Facility Standard	626	
1	Mortise Cylinder	@ Mullion - Match Facility Standard	626	OT
1	Vandal Resistant Trim	VRT26 C	US32D	RO
1	Vandal Resistant Trim	VRT26	US32D	RO
2	Surface Closer	351 P10	EN	SA
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
2	Door Stop	466-RKW	Black	RO
1	Threshold	158A or per Sill Detail		PE
1	Gasketing (Head)	2891AS		PE
2	Gasketing (Jambs)	290AS		PE
1	Rain Guard	346C (Omit @ overhang)		PE
1	Mullion Gasketing	5110BL		PE
2	Sweep	315CN		PE

Set: 5.0

Doors: C105A, C106, M109, M119A
Description: EXTERIOR STAIR

1	Continuous Hinge	FM300 WEP	630	MR
1	Rim Exit Device, Storeroom	43 5CH 8804 Less Pull x 525	US32D	SA
1	Rim Cylinder	Match Facility Standard	626	
1	Vandal Resistant Trim	VRT26 C	US32D	RO
1	Surface Closer	351 P10	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	466-RKW	Black	RO
1	Threshold	158A or per Sill Detail		PE
1	Gasketing (Head)	2891AS		PE
2	Gasketing (Jambs)	290AS		PE
1	Rain Guard	346C (Omit @ overhang)		PE
1	Sweep	315CN		PE

Set: 6.0

Doors: A108

Description: EXTERIOR ELEV. MACH. ROOM (PAIR)

6	Hinge, Full Mortise	TA2314 (NRP)	US32D	MK
1	Dust Proof Strike	570	US26D	RO
1	Self Latching Flush Bolt	2845/2945 as req'd	US32D	RO
1	Storeroom/Closet Lock	LC 8204 LE2L	US32D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Coordinator	2600 series x Brkts as req'd	Black	RO
2	Surface Closer	351 UO	EN	SA
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
2	Door Stop	466-RKW	Black	RO
1	Threshold	158A or per Sill Detail		PE
1	Smoke Gasketing	S88BL		PE
2	Sweep	315CN		PE
1	Overlapping Astragal	357SP		PE

Notes: Door Closers - Mount door Closer on the PUSH side on Out-swinging doors.

Set: 7.0

Doors: C108

Description: EXTERIOR FIRE RISER

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Storeroom/Closet Lock	LC 8204 LE2L	US32D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Surface Closer	351 O	EN	SA
1	Door Stop	441H	US26D	RO
1	Threshold	158A or per Sill Detail		PE
1	Smoke Gasketing	S88BL		PE
1	Sweep	315CN		PE

Set: 8.0

Doors: K101B
Description: EXTERIOR KITCHEN (PAIR)

2	Continuous Hinge	FM300 WEP	630	MR
1	Dust Proof Strike	570	US26D	RO
1	Self Latching Flush Bolt	2845/2945 as req'd	US32D	RO
1	Classroom Lock	LC 8237 LE2L	US32D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
2	Surface Closer	351 UO	EN	SA
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
2	Door Stop	465	US26D	RO
1	Threshold	158A or per Sill Detail		PE
1	Smoke Gasketing	S88BL		PE
1	Rain Guard	346C (Omit @ overhang)		PE
2	Sweep	315CN		PE
1	Overlapping Astragal	357SP		PE

Set: 9.0

Doors: C104A, C107B
Description: EXTERIOR SCIENCE LAB / MUSIC CLASSROOM (PAIR)

2	Continuous Hinge	FM300 WEP	630	MR
1	Dust Proof Strike	570	US26D	RO
1	Self Latching Flush Bolt	2845/2945 as req'd	US32D	RO
1	Classroom Security Intruder Lock	LC V01 8238 LE2L	US32D	SA
2	Mortise Cylinder	Match Facility Standard	626	OT
1	Coordinator	2600 series x Brkts as req'd	Black	RO
2	Surface Closer	351 P10	EN	SA
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
2	Door Stop	466-RKW	Black	RO
1	Threshold	158A or per Sill Detail		PE
1	Gasketing (Head)	2891AS		PE
1	Gasketing (Jambs)	290AS		PE
2	Sweep	315CN		PE
1	Overlapping Astragal	357SP		PE

Set: 10.0

Doors: M110B, M113B, M117
Description: EXTERIOR GIRL'S/BOY'S LOCKER ROOM / STAFF LOUNGE

1	Continuous Hinge	FM300 WEP	630	MR
1	Classroom Security Intruder Lock	LC V01 8238 LE2L	US32D	SA
2	Mortise Cylinder	Match Facility Standard	626	OT
1	Surface Closer	351 P10	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	466-RKW	Black	RO
1	Threshold	158A or per Sill Detail		PE
1	Smoke Gasketing	S88BL		PE
1	Sweep	315CN		PE

Set: 11.0

Doors: A114A, A114B, M202A, M202B
Description: CORRIDOR x HOLD-OPEN (PAIR)

2	Continuous Hinge	FM300 WEP	630	MR	
1	Concealed Vert Rod Exit, Passage	12 NB 43 5CH WD8615 ETL x 525	US32D	SA	
1	Concealed Vert Rod Exit, Exit Only	12 NB 43 5CH WD8610 EO x 525	US32D	SA	
2	Surface Closer - Pocket door	351 OTP	EN	SA	
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	
2	Electromagnetic Holder	1560/1561 type as req'd	EN	SA	⚡
1	Smoke Gasketing	S88BL		PE	
1	Meeting Astragal Set	18041CSB		PE	

Set: 12.0

Doors: M120B, M120C, M121B, M121C, M201A, M201B, M203A, M203B
Description: STAIRS

1	Continuous Hinge	FM300 WEP	630	MR
1	Rim Exit Device, Passage	12 43 5CH 8815 ETL x 525	US32D	SA
1	Surface Closer	351 O	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	466-RKW	Black	RO
1	Threshold	171A or Per Sill Detail		PE
1	Smoke Gasketing	S88BL		PE
1	Sweep	315CN		PE

Set: 13.0

Doors: M101A, M101D, M101F, M101G, M101H
Description: GYMNASIUM (PAIR)

2	Continuous Hinge	FM300 WEP	630	MR
1	Removable Mullion	12-L980	PC	SA
2	Rim Exit Device	12 43 5CH 8816 ETL x 525	US32D	SA
2	Rim Cylinder	Match Facility Standard	626	
1	Mortise Cylinder	@ Mullion - Match Facility Standard	626	OT
2	Surface Closer	351 CPS	EN	SA
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
2	Door Stop	466-RKW	Black	RO
1	Threshold	171A or Per Sill Detail		PE
1	Smoke Gasketing	S88BL		PE
1	Mullion Gasketing	5110BL		PE
2	Meeting Astragal Set	18041CSB		PE

Set: 14.0

Doors: M102A, M102B
Description: STAIR ACCESS

1	Continuous Hinge	FM300 WEP	630	MR
1	Rim Exit Device	12 43 5CH 8816 ETL x 525	US32D	SA
1	Rim Cylinder	Match Facility Standard	626	
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Surface Closer	351 P10	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	441H	US26D	RO
1	Threshold	171A or Per Sill Detail		PE
1	Smoke Gasketing	S88BL		PE
1	Sweep	315CN		PE

Set: 15.0

Doors: M104, M107
Description: STORAGE (PAIR)

6	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Auto Flush Bolt w/Fire Bolt	2848/2948 as req'd	US32D	RO
1	Storeroom/Closet Lock	LC 8204 LE2L	US26D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Coordinator	2600 series x Brkts as req'd	Black	RO
2	Surface Closer	351 UO	EN	SA
2	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
1	Smoke Gasketing	S88BL		PE
1	Astragal	355CS		PE

Notes: Door Closers - Mount door Closer on the PUSH side on Out-swinging doors.

Set: 15.1

Doors: M103, M106
Description: STORAGE (PAIR)

6	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Auto Flush Bolt w/Fire Bolt	2848/2948 as req'd	US32D	RO
1	Storeroom/Closet Lock	LC 8204 LE2L	US26D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Coordinator	2600 series x Brkts as req'd	Black	RO
2	Surface Closer	351 UO	EN	SA
2	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
1	Astragal	355CS		PE
2	Silencer	608-RKW		RO

Notes: Door Closers - Mount door Closer on the PUSH side on Out-swinging doors.

Set: 16.0

Doors: K102, K107, M101B, M101E, M204, M205
Description: CUSTODIAN / UTILITY ROOM / DRY STORAGE ROOM

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Storeroom/Closet Lock	LC 8204 LE2L	US26D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Surface Closer	351 UO	EN	SA
1	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
3	Silencer	608-RKW		RO

Notes: Door Closers - Mount door Closer on the PUSH side on Out-swinging doors.

Set: 17.0

Doors: M105, M112
Description: CUSTODIAN / DATA

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Storeroom/Closet Lock	LC 8204 LE2L	US26D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Surface Closer	351 UO	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	441H	US26D	RO
1	Threshold	171A or Per Sill Detail		PE
1	Sweep	315CN		PE

Set: 18.0

Doors: A103, A104, A105, A111
Description: OFFICE

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Office/Entry Lock	LB LC 8205 LE2L	US26D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
3	Silencer	608-RKW		RO
1	Coat Hook	RM801	US26D	RO

Set: 19.0

Doors: M115
Description: OFFICE (FIRE-RATED)

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Office/Entry Lock	LB LC 8205 LE2L	US26D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Surface Closer	351 UO	EN	SA
1	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
1	Smoke Gasketing	S88BL		PE
1	Coat Hook	RM801	US26D	RO

Set: 20.0

Doors: A112
Description: NURSE

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Classroom Lock	LC 8237 LE2L	US26D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
3	Silencer	608-RKW		RO

Set: 21.0

Doors: K101A, K106, K108, M110A, M113A, M116A
Description: KITCHEN / VESTIBULE / LOCKER ROOM / WORK ROOM

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Classroom Lock	LC 8237 LE2L	US26D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Surface Closer	351 UO	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
1	Smoke Gasketing	S88BL		PE

Set: 21.1

Doors: M116B
Description: STAFF LOUNGE

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Classroom Lock	LC 8237 LE2L	US26D	SA
1	Mortise Cylinder	Match Facility Standard	626	OT
1	Surface Closer	351 UO	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
3	Silencer	608-RKW		RO

Set: 22.0

Doors: C107A
Description: MUSIC CLASSROOM (PAIR)

6	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Self Latching Flush Bolt w/Fire Bolt	2849/2949 as req'd	US32D	RO
1	Classroom Security Intruder Lock	LC V01 8238 LE2L	US26D	SA
2	Mortise Cylinder	Match Facility Standard	626	OT
1	Coordinator	2600 series x Brkts as req'd	Black	RO
2	Surface Closer	351 P10	EN	SA
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
2	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
1	Smoke Gasketing	S88BL		PE
1	Astragal	355CS		PE

Set: 23.0

Doors: A102, C101, C102, C103, C104B, C201, C202, C203, C204, C205, C206, C207, C208
Description: CLASSROOM

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Classroom Security Intruder Lock	LC V01 8238 LE2L	US26D	SA
2	Mortise Cylinder	Match Facility Standard	626	OT
1	Surface Closer	351 P10	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
1	Smoke Gasketing	S88BL		PE

Set: 24.0

Doors: A106
Description: CONFERENCE

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Passage Latch	8215 LE2L	US26D	SA
1	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
3	Silencer	608-RKW		RO

Set: 25.0

Doors: A113, M118
Description: NURSE TOILET / RESTROOM

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Privacy Lock	V20 8265 LE2L	US26D	SA
1	Mop Plate	K1050 6" high CSK BEV	US32D	RO
1	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
3	Silencer	608-RKW		RO
1	Coat Hook	RM801	US26D	RO

Set: 26.0

Doors: K105, K109
Description: BOYS/GIRLS RESTROOM

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Push Pull Plate	110x73C/73CL	US32D	RO
1	Surface Closer	351 UO	EN	SA
1	Mop Plate	K1050 6" high CSK BEV	US32D	RO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
3	Silencer	608-RKW		RO

Set: 27.0

Doors: M102C
Description: COAT CLOSET

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Passage Latch	8215 LE2L	US26D	SA
1	Surface Closer	351 UO	EN	SA
1	Wall / Floor Stop	406 / 441H type as req'd	US26D	RO
1	Threshold	171A or Per Sill Detail		PE
1	Smoke Gasketing	S88BL		PE
1	Sweep	315CN		PE

END OF SECTION

SECTION 08 80 00
GLAZING

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

B. Principal Work in this Section:

1. All glass and glazing for the Project except as noted below.

2. Glazing accessories.

3. Glazing sealants.

C. Related Work:

1. Section 08 88 13 - Fire-Resistant Glazing

1.03 SUBMITTALS

A. Procedure: In compliance with Section 01 30 00.

B. Samples: 12 in. square labeled samples of each type and color of glass, except heat treated, with taped or ground edges.

C. Certification: Glass manufacturer's certification as specified.

1.04 QUALITY ASSURANCE

A. Manufacturer's Certification: Submit manufacturer's certification that all materials to be used in the glazing system such as sealants, setting blocks, spacers, backing rods, metal finishes, etc. have been reviewed by the glass manufacturer, and are compatible with the glass supplied to the Project site, and will not cause deterioration, premature aging, and staining of adjacent materials.

B. Labeling:

1. Submit a certificate stating that the glass furnished for the Project complies with the Specifications.

2. Label each piece of heat-treated glass with a permanent logo etched in one corner to identify the fabricator.

1.05 PERFORMANCE REQUIREMENTS FOR GLASS

A. Insulating glass shall not experience fogging, wetting or staining within the sealed space, nor spacer corrosion, spacer migration, adhesive or cohesive failure of primary or secondary edge seal. Insulating glass shall not experience decrease in the air space dimension due to chemical reaction of desiccant with entrapped gas. Insulated glass units shall have a classification of Class CBA per ASTM E 774.

B. Glass shall not experience spontaneous breakage.

C. Glass center deflection relative to glass edges at 50% of design pressures shall not exceed 1 in. Glass deflection at 150% of design pressures shall be limited to prevent disengagement from frame.

1. For insulating glass edge construction, it shall be assumed that the entire outward design pressure is supported solely by the outdoor glass.

D. Examine heat-strengthened and tempered glass and discard any lights which exceed the following tolerances:

1/16 in. bow in 2 ft.
1/8 in. bow in 5 ft.
¼ in. bow in 10 ft.
3/8 in. bow in 15 ft.

1. Where the strengthening process results in essentially parallel ripples or waves, the deviation from flatness at any peak shall not exceed 0.0005 in., and the difference between adjacent peaks shall not exceed 0.003 in.

2. Where bow tolerance and wave tolerance differ, the stricter requirement shall govern.

3. Direction of ripples shall be consistent.

E. Glazing materials shall be qualified by tests in accordance with UBC Standard 7-2 (for fire doors) or UBC Standard 7-4 (for fire windows) as appropriate for the use, and they shall be labeled for the required fire-protection rating and installed in accordance with their listing. Glazing in fire door assemblies and in fire window assemblies subject to human impact in hazardous locations as indicated in CBC Section 2406.4 shall comply with CBC Section 2406.3.

1.06 HANDLING

A. Procedure: In accordance with Section 01 65 00.

B. Precautions: Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, run-off, and other causes.

1.07 PROJECT CONDITIONS

A. Do not proceed with installation of bulk sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.

1.08 WARRANTY

A. Warrant insulating glass against fogging, loss of transparency and frost build-up between the glass panes due to defective materials or sealant failure for 5 years after Substantial Completion.

B. Warrant coating on spandrel glass against cracking, peeling, wrinkling, color fading, blistering, flaking, delaminating, staining and discoloration for 5 years after Substantial Completion.

C. Glass shall not experience spontaneous breakage.

1. This Specification defines nickel sulfide stones as a glass material defect.

2. Installed tempered glass which breaks due to nickel sulfide stones shall be included in the warranty.

D. Replace defective materials and workmanship during the warranty period at not cost to the District.

2.00 PRODUCTS

2.01 GLASS

A. General:

1. Float glass shall comply with ASTM C 1036; heat-treated glass shall comply with ASTM A 1048.

2. All tinted glass shall be made by the same manufacturer.

3. Tempered glass shall be tempered horizontally; mark glass as specified above identifying it as tempered glass.

4. Unless otherwise indicated or specified, overall thickness of each glass type shall be consistent throughout the Project.

B. Insulating Glass Units:

1. Provide insulating glass assemblies CBA rated by IGCC when tested in compliance with ASTM E 774, and permanently labeled with the appropriate certification label of IGCC, ALI or NCTL.

2. Sealing System: Dual seal, primary and secondary sealants shall be manufacturer's standard sealants.

3. Spacers: Aluminum with clear anodized finish.

4. Desiccant: Either molecular sieve or silica gel or blend of both.

5. Corner Construction: Manufacturer's standard corner construction.

C. Glass Types:

1. Type A: Clear, 1/4 in. thick, tempered, float glass.

2. Type B: 1 in. thick insulated assembly consisting of 1/4 in. thick, tempered clear Solarban 60 solar control Low-E glass by PPG, ½ in. argon gas space, and Type A glass for the interior lite. Glass shall provide a visible light transmittance of 70 percent and a shading coefficient of .44.

2.02 MISCELLANEOUS GLAZING MATERIALS

A. Setting Block: Neoprene, silicone, or EPDM, 80 – 90 durometer hardness, compatible with sealants used, 6 in. long minimum.

B. Spacer: Neoprene, silicone, or EPDM, 50 – 60 durometer hardness, compatible with sealants used.

C. Sealants:

1. For all conditions, except primary seal of insulating units: General Electric Silglaze, or Dow Corning 795 or 999.

2. For Primary Seal of Insulating Units: Manufacturer's standard sealant.

D. Glazing Gaskets: Molded resilient continuous neoprene, silicone, or EPDM extrusions, 40 to 60 Shore A durometer hardness, meeting the requirements of ASTM C 509 for cellular (closed-cell) material, and AAMA SG-1 for non-cellular (dense) material.

E. Compressible Filler Rod:

1. Closed-dell or waterproof jacketed rod stock of synthetic rubber or plastic foam compatible with sealants used, flexible and resilient, with 5 to 10 psi compressive strength at 25% deflection.

2. Do not use vinyl foam stock.

F. Cleaner, Primer and Sealer: Type recommended by sealant or gasket manufacturer.

2.03 FABRICATION

A. Cutting:

1. Obtain sizes from shop drawings or by field measurement. Cut glass to fit each opening with at least the minimum edge clearance and bite on glass recommended by glass manufacturer.

2. When glass will be precut to sizes obtained from shop drawings, take field measurements of each opening before glazing to verify adequate bite on glass and minimum edge clearance. Glaze openings which do not fall within tolerances for which precut glass has been sized only with glass specially cut to fit such openings.

3. Do not nip glass edges. Edges may be wheel cut or sawed and seamed at manufacturer's option.

4. For glass to be cut at site, provide glass 2 in. larger than required, in both dimensions, to facilitate cutting of clean-cut edges without seaming or nipping.

5. Do not cut, seam, nip, or abrade tempered glass after tempering.

6. Provide flat ground edges with arrised corners where glass edge is not covered by a metal stop.

3.00 EXECUTION

3.01 INSPECTION

A. Verify conditions and measurements affecting the work of this Section at site.

B. Make sure that openings and frames to be glazed are within allowable tolerances, plumb, level and square. Inspect framing joint intersections to insure that the offset in the joinery will not impose undue edge pressure on the glass in compliance with FGMA, Glazing Manual, and Sealant Manual, guidelines.

C. Verify that other detrimental conditions are corrected before proceeding with installation.

3.02 STANDARDS AND PERFORMANCE

A. Watertight and airtight installation is required for each piece of glass installed in an exterior wall.

B. Each installation must withstand normal temperature changes, wind loading, and impact from normal operation for doors, without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the Work.

1. Installed glass shall be free from rattle.

C. Protect glass from damage at all times during handling, installation and operation of the building until Substantial Completion.

D. Comply with combined recommendations of glass manufacturer and manufacturer of sealants and other materials used in glazing, except where more stringent requirements are specified.

E. Comply with FGMA, Glazing Manual, and Sealant Manual, guidelines, except as recommended otherwise by the manufacturers of the glass and glazing materials.

F. Inspect each piece of glass immediately before installation, and eliminate those with edge damage or face imperfections.

G. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw and bow oriented in the same direction as other pieces.

3.03 PREPARATION FOR GLAZING

A. Immediately before glazing, clean the glazing channel and other framing members to receive glass.

1. Remove coatings which are not firmly bonded to the substrate.

2. Verify that framing is satisfactory to receive the glass.

B. Apply primer or sealer to joint surfaces when recommended by sealant manufacturer.

3.04 GLASS INSTALLATION

A. Install setting blocks of proper size for all glass. Use glass manufacturer's recommended size and spacing. Set blocks in thin course of the heel-bead compound, if used; do not block weep holes.

B. Provide spacers inside and out unless continuous gaskets are used. Use glass manufacturer recommended size and spacing.

C. Prevent exudation of sealant or compound by forming voids or installing filler rods in the channel at the heel of jambs and head (do not leave voids in the sill channels, except as needed for drainage and weep holes) depending on light size, thickness and type of glass, and complying with manufacturer's recommendations.

D. Do not nip glass. Do not install glass with edge damage.

E. Force sealants into channel to eliminate voids and to assure complete "wetting" or bond of sealant to glass and channel surfaces.

F. Tool exposed surfaces of sealants to provide a substantial "wash away" from the glass. Install pressurized gaskets to protrude slightly out of the channel, so as to eliminate dirt and moisture pockets.

G. Clean and trim excess glazing materials from the glass, stops and frames promptly after installation, and eliminate stains and discolorations.

H. Where wedge-shaped gaskets are driven into one side of the channel to pressurize the sealant or gasket on the opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when subjected to dynamic movement.

1. Anchor gasket to stop with matching ribs, or with adhesive.

3.05 CURING / PROTECTING / CLEANING

A. Cure glazing sealants and compounds in compliance with their manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.

B. Protect glass from breakage immediately upon installation. Do no apply markers of any type to glass.

C. Before Substantial Completion, remove and replace glass which is broken, chipped, cracked, abraded, stained or damaged in other way, including natural causes, accidents and vandalism.

D. Maintain glass in a clean condition during construction so that it will not be damaged by corrosive action and will not contribute (by wash-off) to the deterioration of glazing materials and other work.

E. Remove remaining labels and wash and polish glass on both faces not more than 4 days prior to District's acceptance of the work in each area. Comply with glass manufacturer's recommendations.

END OF SECTION

SECTION 08 88 13

FIRE RESISTANT GLAZING

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

B. Section Includes:

1. Fire-rated glazing materials installed as vision lights in fire-rated doors.
2. Fire-rated glazing materials installed adjacent to fire-rated doors.
3. Fire rated glazing materials installed in interior windows.

C. Related Sections include the following:

1. Section 08 11 00 - Metal Doors and Frames: for vision panels in interior doors.
2. Section 08 20 00 - Wood Doors: for vision panels in interior doors.
3. Section 08 41 13 - Aluminum-Framed Entrance and Storefront.
4. Section 08 51 13 - Aluminum Windows.
5. Section 08 80 00 – Glazing

1.03 REFERENCES

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

1. ASTM E2074-00: Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.

B. American National Standards Institute (ANSI):

1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings

D. Consumer Product Safety Commission (CPSC):

1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials

E. Glass Association of North America (GANA):

1. GANA – Glazing Manual.
2. FGMA – Sealant Manual.

F. National Fire Protection Association (NFPA):

1. NFPA 80: Fire Doors and Windows.
2. NFPA 252 – Fire Tests of Door Assemblies.

G. Underwriters Laboratories, Inc. (UL):

1. UL 10B – Fire Tests of Door Assemblies.
2. UL 10C – Positive Pressure Fire Tests of Door Assemblies.

H. California Building Code (CBC) 2010 Edition.

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1.04 PERFORMANCE REQUIREMENTS

A. Fire-rated tempered glass clear and wireless glazing material for use in impact safety-rated locations with fire rating requirements of 20 minutes without hose stream test; for use in interior and exterior applications.

B. Passes positive pressure test standards UL 10C, UBC 7-2 and UBC 7-4.

1.05 SUBMITTALS

A. Comply with requirements of Section 01300.

B. Product data: Submit manufacturer's technical data for each glazing material required, including installation and maintenance instructions.

C. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.

D. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.

E. Samples: Submit, for verification purposes, approx. 8-inch by 10-inch sample for each type of glass indicated.

1.06 QUALITY ASSURANCE

F. Glazing Standards: FGMA Glazing Manual and Sealant Manual.

G. Fire-Rated Glass: Each lite shall bear permanent, nonremovable label of UL and/or WHI certifying it for use in tested and rated fire protective assemblies.

H. Fire Protective Glazing Products for Door Assemblies: Products identical to those tested per ASTM E 152 and UL 10B, labeled and listed by UL and/or WHI or other certification agency acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

I. Deliver, store, and handle materials under provisions of Section 01655

J. Deliver materials to specified destination in manufacturer's or distributor's packaging, undamaged, complete with installation instructions.

K. Store off ground, under cover, protected form weather and construction activities.

1.08 WARRANTY

L. Provide manufacturer's limited warranty.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer: Fireglass20® as manufactured by J.R. Four Ltd., and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065, voice 1-800-426-0279, fax 1-800-451-9857,
e-mail sales@fireglass.com, web site www.fireglass.com.

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B. Properties:

1. Thickness: 1/4 inch.
2. Weight: 3.0 lbs./sq. ft.
3. Approximate Visible Transmission: 89 percent.
4. Approximate Visible Reflection: 8 percent.
5. Fire-rating: 20 minutes (WITHOUT HOSE STREAM TEST).
6. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).

C. Labeling: Permanently label each piece of fireglass 20™ with the fireglass 20™ logo, UL logo and fire rating in sizes up to 6,396 sq. in.

D. Fire Rating: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with [ASTM E2074-00] [NPFA 252] [UL 9, UL 10B and UL10C].

2.02 GLAZING COMPOUND FOR FIRE-RATED GLAZING MATERIALS

A. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent.

B. Setting Blocks: Neoprene, EPDM or hardwood; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.

C. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.03 FABRICATION®

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

3.00 EXECUTION

3.01 INSPECTION

A. Examine glass framing, with glazier present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
2. Minimum required face or edge clearances.
3. Observable edge damage or face imperfections.

B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

C. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.02 INSTALLATION (GLAZING)

A. Comply with referenced GANA standards and instructions of manufacturers of glass, glazing sealants, and glazing compounds.

B. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.

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C. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.

D. Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.

E. Place setting blocks located at quarter points of glass with edge block no more than 6-inches from corners.

F. Glaze vertically into labeled fire-rated metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.

G. Place glazing tape on free perimeter of glazing in same manner described above.

H. Provide minimum edge clearance of >1/4 inch (+1/8 inch/-1/16 inch) and a minimum edge cover of <3/8 inch (+1/16 inch/-1/16 inch).

I. Install removable stop and secure without displacement of tape.

J. Install in vision panels in fire-rated doors to requirements of NFPA 80.

K. Install so that appropriate [UL] [fireglass 20™] markings remain permanently visible.

3.03 PROTECTION AND CLEANING

A. Protect glass from contact with contaminating substances resulting from construction operations. Remove any such substances by method approved by glass manufacturer.

B. Wash glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of substantial completion. Wash glass by method recommended by glass manufacturer.

3.04 GLAZING SCHEDULE

Rating	Assembly	Max. Exposed Area (Sq. In.)	Max. Width Of Exposed Glazing (In.)	**OR**	Max. Height Of Exposed Glazing (In.)	Stop Height
20 min. [W/O HOSE STREAM TEST]	Doors	3,204	36		89	5/8”

END OF SECTION

SECTION 09 20 00
DRYWALL SUSPENSION SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

A. Description of Work: Work of this Section includes, but is not limited to, the following:
   1. Metal Suspension Systems framing members for Plaster and Gypsum Board Assemblies
   2. Main Tees, Cross Tees, Perimeter Angles, Perimeter Channels, Hanger Wire, and Accessories

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions with Project conditions and materials clearly identified or detailed for each required system.
B. Samples: 12 inch long samples of suspension system components

1.3 SYSTEM REQUIREMENTS

A. Performance Requirements: Fabricate and install systems as indicated but not less than that required to comply with ASTM C754 under the following conditions:
   1. A pre-engineered drywall suspension system consisting of straight main tees (for Wall-to-Wall system) or straight main tees and straight furring cross tees, that join together to support screw attached (interior gypsum panels) (gypsum fiber panels) (gypsum base panels) and independently supported light fixtures, and air diffusers, where applicable. (*Where applicable, installed systems must conform to Underwriter's Laboratories, Inc. (UL) Fire Resistance Design No.*)
   2. Maximum deflection of l/360 of distance between supports.

1.4 QUALITY ASSURANCE

A. Reference Standards
   1. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
   2. ASTM A 645 Standard for Nonstructural Framing Members
   3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated, (Galvanized) by the Hot-Dipped Process
   4. ASTM C635, Standard Specifications for Metal Suspension Systems
   5. ASTM C636, Recommended Practice for Installation of Metal Suspension Systems
   6. CISCA Ceiling Systems Installation Handbook
   7. ASTM C1186, Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets. [Include if DUROCK panels are used, otherwise delete]
   8. ASTM C1278, Standard Specification for Fiber-Reinforced Gypsum Panels [Include if FIBEROCK panels are used, otherwise delete]
   9. ASTM C645, Standard Specification for Non-Bearing (Axial) Steel Studs, Runners, (Track), and Rigid Furring Channels for Screw Application of Gypsum Board
   10. ASTM C754, Specification for Installation of Steel framing Members to Receive Screw-Attach Gypsum Boards
   11. ASTM C840 Specification for Application & Finishing of Gypsum Board

12. (ASTM E119, Standard Test Methods for Fire Tests of Building Construction and Materials)
13. (Underwriters Laboratories Inc. (UL) Fire Resistance Directory)
14. NOA # 17-09-19.03, TAS 202 and TAS 203

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery:
    1. Deliver material to site promptly without undue exposure to weather.
    2. Deliver in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.
B. Inspection:
    1. Promptly inspect delivered materials, file freight claims for damage during shipment, and order replacement materials as required. Any damaged materials shall be promptly removed from the job site.
C. Storage:
    1. Store above ground in dry, ventilated space.
    2. Protect materials from soiling, rusting, and damage.
    3. Store board to be directly applied to masonry walls at 70°F for 24 hours prior to installation.
D. Handling:
    1. Handle in such a manner to insure against racking, distortion or physical damage of any kind.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:
    1. Do not install gypsum board when ambient temperature is below 40°F.
    2. For adhesive attachment of gypsum board, and for finishing of gypsum board, maintain ambient temperature above 55°F from one week prior to attachment or joint treatment, and until joint treatment is complete and dry.

1.7 ALTERNATE CONSTRUCTION WASTE DISPOSAL

A. Reuse:
    1. Separate clean waste drywall pieces from contaimants for landfilling or recycling. Do not include vinyl faced, mold-resistant or asphalt impregnated gypsum boards. Pulervize and apply to site soil in accordance to landscape specifications. Protect scrapes and pulervized material from moisture and contamination. Alternate to on-site soil amendment, work to supply local farming granular material for their use.
B. Recycle:
    1. Separate clean waste drywall pieces from contaimants for landfilling or reuse. Working with local waste hauler and local drywall manufacturer, provide proper storage of waste for pickup and return. Protect scrapes material from moisture and contamination.

1.8 COORDINATION WITH OTHER WORK

A. General:
    1. Coordinate with other work including mechanical and electrical work and partition systems. Installation of conduit and ductwork above suspension system shall be complete before installation of suspension system.

B. Protection:
    1. Follow good safety and industrial hygiene practices during handling and installation of all products and systems, with personnel to take necessary precautions and wear appropriate personal protective equipment as needed. Read Material Safety Data Sheets and related literature for important information on products before installation. Contractor to be solely responsible for all personal safety issues during and subsequent to installation; architect, specifier, owner and manufacturer will rely on contractor's performance in such regard.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. All manufactured by USG (United States Gypsum Company, USG Interiors), Chicago, IL, USA, in compliance with applicable ASTM Standards. Contact your local USG Sales Representative for requests.

2.02 MATERIALS - SUSPENSION SYSTEMS

A. USG Drywall Suspension Systems – Commercial quality, cold-rolled steel, hot dipped galvanized finish.
    1. Main Tees: Fire-Rated Heavy Duty classification 1.617" high x 144" long, integral reversible splice with knurled face. (DGLW-26 1-1/2" Face and 1.617" high)
        a. Cross Members: Fire-Rated members with knurled face. Cross Tees: DGLW-424 cross tee 1-1/2" high x 48" long with 1-1/2" wide face; DGLW-224 Fire-Rated: 1-1/2" high x 24" long with 1-1/2" face
    2. quick release cross tee ends for positive locking and removability without tools
    3. Accessory Cross Tees: Cross tees must have knurled faces and quick release cross tee ends for positive locking and removability without tools.
        a. DGW-6026DM: 1.617" high x 5' long with a 1-1/2" face
        b. DGW-7226DM: 1.617" high x 6' long with a 1-1/2" face
        c. DGW-8426DM: 1.617" high x 7' long with a 1-1/2" face
        d. DGW-9626DM: 1.617" high x 8' long with a 1-1/2" face
    4. Wall Moldings: Single web with knurled face
        a. DGWM-24: 1-1/2" x 1" x 144" long wall molding
        b. DGCM-27: 144" x 1-5/8" x 1" x 1" channel molding
        c. DGLC-12: 144" x 1-3/4" x 1" x 1" index channel molding
    5. Accessories
        a. DGSC-180: Splice Clip
        b. DGTC-90: Transition Clip
        c. DGWC: Wall Attachment Clip
        d. DGSP-180: Splice Plate
        e. DGHUB: Dome Hub
        f. CMAC-1: Close Mount Attachment Clip
    6. Wire: Hanger Wire 12 ga., galvanized or as noted on drawings
B. USG Drywall Wall-to-Wall Suspension Systems – Commercial quality, cold-rolled steel, hot dipped galvanized finish for use in corridors and short span applications.
    1. Main Tees: Fire-Rated Heavy Duty classification 1.617" high x [6'] [8'] [10'] [12'] [14'] [Custom] long, integral reversible splice with 1-1/2" knurled face.
    2. Wall Moldings: Single web with knurled face, 1-1/2" x 1" x 12' long, DGWM24
    3. Wall Channel: Single web with knurled face, 1-5/8" x 1" x 12' long, DGCM27
    4. Locking Wall Channel: Single web with knurled face, 1-3/4" x 1" x 12' long, DGLC-12
C. Grid Suspension Assemblies: Listed products establish standard of quality and are manufactured by United States Gypsum Company (USG), Chicago, IL

2.03 MATERIALS - BOARDS

A. Gypsum Board:
    1. ASTM C36, regular type except where Type X or Type C fire-resistant type is indicated or required to meet UL assembly types.
    2. Edges: Tapered
        a. SHEETROCK Brand Gypsum Panels have long edges tapered on the face side to form a shallow channel for joint reinforcement.
        b. SHEETROCK brand Gypsum Panels, SW Edge, have an exclusive tapered rounded edge design to help minimize ridging or beading and other joint imperfections and help compensate for extremes of temperature and humidity during construction. The SW system produces a stronger joint than with regular gypsum panels. Setting-type joint compound is recommended with this shape edge. Except for the rounded edge, SW Panels are tapered like, and otherwise identical to, regular tapered-edge gypsum panels.
        c. Typical thickness for different applications include:
           5/8 inch thick for commercial installations
           ½ inch thick for single-layer application in residential construction
           1/4 inch thick used as base layer for improving sound control in double layer partitions, for use over old wall and ceiling surfaces and for forming curved surfaces with short radii
        d. Where curved gypsum board construction is indicated, use 1/4 inch thick flexible facing board.
    3. Acceptable products:
        a. Typical partitions and ceilings: Equivalent to SHEETROCK Brand UltraLight FC 30, SHEETROCK Brand SW, FIRECODE or FIRECODE "C" Gypsum Panels by USG.
            i. SHEETROCK brand Gypsum Panels, FIRECODE Core meet the definition of a Type X gypsum board for fire-rated assemblies in the Gypsum Association Fire Resistance Design Manual. Edges: SW tapered or tapered.
        b. OR [depends on edge condition option]: Equivalent to SHEETROCK Brand Regular, FIRECODE or FIRECODE "C" Gypsum Panels by USG.
            i. SHEETROCK brand Gypsum Panels, FIRECODE C Core provide improved fire protection over standard FIRECODE panels due to additives that enhance the integrity of the core under fire exposure. Comply with Type X requirements.
        c. Acceptable product for fire-rated walls: Equivalent to Ultracode Core, 3/4 inch thick, by USG.
            i. SHEETROCK brand Gypsum Panels, ULTRACODE Core, provide 1, 2, 3 and 4 hour fire ratings with fewer layers of gypsum panels than are usually required when used in approved designs.
    4. Acceptable product for curved walls: 1/4" Flexible Gypsum Panels
        a. SHEETROCK brand 1/4 inch Flexible Gypsum Panels bend to fit tight curves without wetting. These 1/4 inch panels are much more flexible than standard SHEETROCK panels of the same thickness.
        b. SHEETROCK brand Gypsum Panels, are made by laminating special kraft-backed aluminum foil to back surface of regular or SW tapered panels with FIRECODE and FIRECODE C cores as indicated. Effective as a vapor retarder for walls and ceilings when applied with foil surface next to the framing in single-layer application or as the base layer in multi-layer systems. In tests per ASTM E96 (desiccant method), ½ inch foil-back panels showed a vapor permeance of 0.06 perm.

C. Drawing reference: Install in accordance with approved shop drawings and locate ceiling in accordance with main tee dimensions relative to elevations.
D. Install in accordance with reference standards and manufacturer's instructions [and as required to comply with seismic requirements].

3.03 APPLICATION INSTALLATION REQUIREMENTS

A. Flat Ceiling Applications
    1. Hanger Wire Installation: Secure hanger wires to upper structural elements and space hangers so that each hanger wire supports a maximum of 16 sq. ft.
    2. Space main tee members a maximum span of 48” on center (or as specified by the UL Fire Resistance Directory)
    3. Space cross tees recommended 16” o.c. (5/8” SHEETROCK Brand gypsum Board or 5/8” FIBEROCK Interior panels can span 24” o.c. Check USG AC3095, for maximum allowable spacing based on wind load) (or as specified by the UL Fire Resistance Directory) Install extra cross tees where butt joints occur, 8” from each side of the butt joint.
    4. Install compression struts per manufacturer’s specifications and spacing, in accordance with wind load if applicable. Adjust main and cross tee spacing as necessary for loading conditions. (See AC3095, USG)
    5. Install fiber glass insulation (R____) in plenum, resting on top of main tees and cross members.
    6. Do not install insulation within 3” of light fixtures unless fixtures are approved for use with insulation.
    7. Limit insulation thickness so that combined weight of supported panels and insulation on grid main tees does not exceed 16 plf
    8. Attach (SHEETROCK gypsum Board) (FIBEROCK Interior panels) (DUROCK Cement Board) to the suspension system main runners, cross tees, and cross channels with (1-1/4” bugle head screws – single layer of board) spaced (16” o.c. – SHEETROCK gypsum Board) (8” o.c.- FIBEROCK) (6” o.c. – DUROCK) in the field and at the perimeter of the panels, locate 3/8” in from panel edges. Hold panels in firm contact with framing while driving fasteners. Drive fastener heads flush with, or slightly below surface of (SHEETROCK gypsum board) (FIBEROCK panels). (Drive fasteners so bottoms of heads are flush with surface of DUROCK cement boards.)
    9. Install trim, and similar accessories as necessary and as applicable to meet project requirements where indicated on drawings.
    10. Install control joints at locations of properly detailed control joints, including additional cross tees as necessary, per direction of architect and/or design professional.
    11. Finish boards as described to achieve ‘Level of Finish’ specified.
B. Corridor (Wall-to-Wall) Applications
    1. Hanger Wire Installation: Secure hanger wires to upper structural elements and space hangers so that each hanger wire supports a maximum of 16 sq. ft.
        a. Note:
            If using ½” single layer of drywall no hangers are required for spans up to 7’-0” (L/240 uniform load, single span design).
            If using 5/8” single layer of drywall no hangers are required for spans up to 6’-0” (L/240 uniform load, single span design).
            If using ½” single layer of drywall for spans over 7’-0” to 14’-0” one hanger at mid span per each main is required (L/240 uniform load, single span design).
            If using 5/8” single layer of drywall for spans over 6’-0” to 12’-0” one hanger at mid span per each main is required (L/240 uniform load, single span design).

c. Limitations: Not recommended as a base for ceramic or other tile or as base layer for SHEETROCK Vinyl-Faced Gypsum Panels or other highly moisture-resistant wall coverings. Also not to be used in hot, humid climates such as the Southern Atlantic and Gulf Coast areas.

5. Ceiling board
    a. ASTM C36, non-sag type
    b. Thickness: ½ inch
    c. Acceptable product: Equivalent to SHEETROCK® Brand UltraLight Panels by USG
        i. SHEETROCK® Brand UltraLight Panels are re-engineered, lightweight gypsum wallboard panels with a high strength-to-weight ratio composite design. The panels have superior sag resistance that eliminates the need for traditional 1/2" sag-resistant ceiling panels. The noncombustible gypsum core is encased in 100% recycled face and back papers. The natural finish face paper is folded around the long edges to protect the core and the ends are cut square and even. The long edges of the panels are tapered, allowing joints to be reinforced with Sheetrock® Brand joint treatment systems. Thickness: ½, 5/8 inch, unless otherwise indicated.
6. Mold-resistant gypsum board
    a. ASTM C1396, regular except where Type X (FIRECODE) or Type C (FIRECODE C) indicated or required to meet UL assembly types
    b. Edges: Tapered
    c. Thickness: 1/2 [5/8](for FIRECODE only), [3/4] inch (ULTRACODE)
    d. Acceptable product: Equivalent to SHEETROCK brand MOLD TOUGH gypsum panels by USG
        i. SHEETROCK® brand MOLD TOUGH™ gypsum panels have a noncombustible, moisture- and mold-resistant gypsum core that is encased in moisture- and mold-resistant, 100 percent recycled green face and brown back papers. The panels feature tapered long edges for easy finishing. The 5/8” FIRECODE and 1/2" FIRECODE C Core panels are UL Classified for fire resistance (Type X or Type C).

B. Cement backer board
    a. Aggregated portland cement board with woven glass fiber mesh facing complying with ANSI A118.9
    b. Thickness: 1/2 [5/8] inch
    c. Acceptable product and manufacturer: Durock Cement Board by USG
        i. DUROCK Cement Board is vapor permeable and does not deteriorate in the presence of water. It is used as a substrate for tile. If a vapor retarder or waterproof construction is specified, a separate barrier must be applied over or behind the DUROCK Board.
        ii. For steam rooms and saunas where temperatures exceed 120 degrees F for extended periods, set tile with dry-set or latex-portland cement mortar; do not use organic adhesive.

2.04 MATERIALS - ACCESSORIES

A. Metal trim for gypsum board
    1. Conform to profile and dimensions indicated
    2. Material for interior Work: Galvanized steel, 26 gauge minimum
    3. Corner beads: Equivalent to Dur-A-Bead No. 103 [104] [800] [900] by USG
    4. Casing beads (edge beads): Equivalent to 200A [200B] [401] [402] [P-1] [701-B] [801-A] [801-B] by USG

5. Control joints
    a. Roll-formed zinc with perforated flanges
    b. Size: 1-3/4 inch wide, with 1/4 inch wide center channel
    c. Provide with removable tape strip over channel
    d. Acceptable product: Equivalent to No. 093 by others

B. Paper-faced metal trim for gypsum board
    1. Conform to profile and dimensions indicated
    2. Material for interior Work: Comply with ASTM C1047
    3. Outside corners: SHEETROCK Brand Paper Faced Metal Bead and Trim [81W] [B1XWEL] [B1 Super Wide] by USG
    4. Outside Bullnose corners: SHEETROCK Brand Paper Faced Metal Bead and Trim [SLOC] [Danish] [Santa Fe] by USG
    5. Inside corners: SHEETROCK Brand Paper Faced Metal Bead and Trim [B2] [SLIC] by USG
    6. Trims: L shape - B4 SERIES, J shape: B9 SERIES by USG

C. Special Trim and Reveals: Extruded aluminum alloy 6063-T5, profiles as indicated

D. Gypsum Board Screws: Self-drilling, self-tapping steel screws
    a. For steel framing less than 0.03 inch thick: Comply with ASTM C1002
    b. For steel framing from 0.033 inch thick to 0.112 inch thick: Comply with ASTM C954
    c. Provide Type S or Type S-12 screws

E. Backer Board Accessories: Provide accessories and corrosion-resistant-coated steel screws as recommended by backer board manufacturer and required for complete installation.

F. Acoustical Sealant: Equivalent to Acoustical Sealant by USG
    . SHEETROCK Acoustical Sealant is a highly elastic, water-based caulking for sound-rated partition and ceiling systems and sealing exterior walls to reduce infiltration. Non-bleeding and staining, pumpable and easily applied in beads. Provides excellent adherence to most surfaces, permanent flexibility and lasting seal. Meets ASTM C919 and ASTM C834.

G. Sound Attenuation Blankets
    . Mineral fiber, conforming to ASTM C665, Type I
    a. Surface burning characteristics per ASTM E84:
        i. Flame spread: 15 or less
        ii. Smoke developed: 0
    b. Thicknesses: As indicated
    c. Sound Attenuation Fire Blankets (SAFB) are paperless, semi-rigid mineral fiber mats designed to improve STC ratings when installed in partitions.
    d. Acceptable product: Sound Attenuation Fire Blankets SAFB by others.[Fire Safety FS-15 Blankets]

H. Miscellaneous Accessories: Provide as required for complete installations.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine substrates and adjoining construction and conditions under which Work is to be installed. Do not proceed with Work until unsatisfactory conditions are corrected.

3.02 GENERAL INSTALLATION REQUIREMENTS

A. Standard reference: Install grid members in accordance with ASTM C636, CISCA installation standards, and other applicable references.

B. Manufacturer’s reference: Install in accordance with manufacturer’s current printed recommendations.

If using 5/8” single layer of drywall for spans over 12’-0” to 14’-0” two hangers at 1/3 point per each main is required (L/240 uniform load, single span design).

2. Space main tee members as required by span and design load
   a. Note:

Maximum load (lbs/sf)	Unsupported span	Main tee spacing
18	4’-0”	16” o.c.
12	4’-0”	24” o.c.
9.2	5’-0”	16” o.c.
6.1	5’-0”	24” o.c.
5.3	6’-0”	16” o.c.
3.6	6’-0”	24” o.c.
3.4	7’-0”	16” o.c.

3. Attach (SHEETROCK gypsum board) (FIBEROCK interior panels) (DUROCK cement board) to the suspension system main runners, cross tees, and cross channels with (1-1/4” bugle head screws – single layer of board) spaced (16” o.c. – SHEETROCK gypsum Board) (8” o.c.- FIBEROCK) (6” o.c. – DUROCK) in the field and at the perimeter of the panels, locate 3/8” in from panel edges. Hold panels in firm contact with framing while driving fasteners. (Drive fastener heads flush with, or slightly below surface of (SHEETROCK gypsum board) (FIBEROCK panels). (Drive fasteners so bottoms of heads are flush with surface of DUROCK cement boards.)
4. Install trim, and similar accessories as necessary and as applicable to meet project requirements where indicated on drawings.
5. Install control joints at locations of properly detailed control joints, including additional cross tees as necessary, per direction of architect and/or design professional.
6. Finish boards as described to achieve ‘Level of Finish’ specified.

C. Curved, vaults, or dome applications
   1. Drawing reference: Install in accordance with approved shop drawings and locate ceiling in accordance with main tee dimensions relative to elevations.
   2. Hanger Wire Installation: Secure hanger wires to upper structural elements and space hangers so that each hanger wire supports a maximum of 12 sq. ft.
      a. Note: Note: Curved surfaces can be achieved with the attachment of panels, however, in order to achieve the best application, plaster is recommended. Due to the width of the grid flange (greater than ¾”) STRUCTO-BASE gypsum basecoat plaster should be used to reduce cracking. If other gypsum plasters or portland plaster are being used then it is recommended to secure narrow flanged framing members or offset the metal lath to reduce cracking due to reduced mechanical key at framing/lath intersection.
         Total weight of ceiling membrane plus overlaid insulation and surface finish material (e.g. ceramic tile) supported by the grid assembly should not exceed 4.0 psf. If the load exceeds 4.0 psf, then spacing of the hanger wires and/or main tees must be reduced (see sample calculation below). For guidance the following are design weights:

         1/2" SHEETROCK Exterior Gypsum Ceiling Board 2.0 psf

         5/8” SHEETROCK Exterior Gypsum Ceiling Board 2.5 psf

1/2” FIBEROCK Sheathing	2.2 psf
5/8” FIBEROCK Sheathing	3.0 psf
1/2” DUROCK Cement Board	3.0 psf
5/8” DUROCK Cement Board	3.75 psf

b. If main tee hanger wires are at 4' o.c., the mains’ load capacity is: 4 FT * 4 psf = 16 #/LF.
By reducing the hanger wires to 3' o.c., the mains can carry 32 #/LF.
By reducing the hanger wires to 2' o.c., the mains can carry 64 #/LF.

3/4" of plaster wet would be about 8.75 #/SF + 5/8" FIBEROCK Sheathing at 3 #/SF for about 12 #/SF.
Mains are at 4 ft centers with 4’ hangers; this load would be 12 #/SF * 4 FT = 48 #/LF.
If the Mains are at 2 ft centers with 4’ hangers; this load would be 12 #/SF * 2 FT = 24 #/LF.

Therefore, there are two options:
1.) Space the main tees at 4' o.c. with the 12 ga. hanger wire at 24" o.c. and within 8" from any wall, cross tees at 16" o.c. with hanger wire support at midspan and/or within 8" from any wall.
2.) Space the main tees at 2' o.c. with the 12 ga. hanger wire at 36" o.c. and within 8" from any wall, cross tees at 16" o.c.

3. Space main and cross tee members so the maximum span of metal lath is (16”) (12”)
4. Secure self-furring metal lath to tee members with screws spaced 6” o.c. max., applied at lath dimples. Lap metal lath ends and edges and secure with 18 gauge tie wire spaced 6-inches o.c.
5. Mix STRUCTO-BASE Gypsum Plaster with sand in proportions of 2 cu. ft. of sand per 100 lbs. of plaster for scratch and brown coats. Apply plaster to metal lath to a thickness of 5/8” (min.) Measured from the face of the lath.
6. Select a plaster mix for the finish coat to provide a smooth trowel or sand float (textured) finish. (Reference SA 920)
7. Use template(s) to insure uniform and even curvature of the finished surface.

END OF SECTION

SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

1.00 GENERAL

1.01 DESCRIPTION

A Division 1 applies to this section. Provide non-load bearing metal support systems, complete.

B. Section Includes:

1. Non-load bearing metal framing for gypsum wallboard walls, elevator shaft walls, ceilings and soffits.

2. Metal backing plates for securing materials of other sections.

C. Related Work Specified Elsewhere:

1. Gypsum wallboard.

2. Cement Backerboard

3. Hanger wires and framing for suspended grid acoustical ceilings.

4. Thermal and sound insulation.

5. Access panels.

6. Metal Decking

1.02 SUBMITTALS

A. Shop Drawings: Submit showing details for each typical wall, partition and ceiling system. Show all conditions of closures at and connections to, metal roof decking.

B. Product Data: Submit complete material list for all work of this section. Submit copies of UL test reports and local approvals for fire rated assemblies. Submit manufacturer's product data for all manufactured items.

1.03 QUALITY ASSURANCE

A. Code: Conform all installations to code. In case of conflict between contract documents and code, the more stringent requirements shall govern. Conform fire resistance rated construction to requirements of DSA and CSFM.

B. Reference Specification: Except as modified herein or required by code, conform metal support systems for plaster to the CLPCA Plaster/Metal Framing/Lath Manual and to MLSFA Metal Lathing and Furring.

C. Tolerances: Erect walls and partitions on straight lines, plumb, free of twists or other defects, and contacting a 10-foot straightedge for its entire length at any location within a 1/8" tolerance. Erect horizontal framing level within a tolerance of 1/8" in 12-feet in any direction.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the job site and store in ventilated dry locations. Storage area shall permit easy access for inspection and handling. If materials are stored outdoors, stack materials off the ground, supported on a level platform, and fully protected from the weather. Handle materials carefully to prevent damage. Remove damaged items and provide new items.

2.00 PRODUCTS

2.01 MATERIALS

A. Wall Framing and Furring for Gypsum Wallboard:

1. Non-Loadbearing: Studs for non-loadbearing walls shall conform to ASTM A446. Studs shall be C-shaped and CH shaped studs at shaft walls, roll-formed steel with minimum uncoated design thickness of 18 gauge, made from G40 hot-dip galvanized coated sheet. Floor and ceiling runner tracks shall conform to ASTM A446. Tracks shall be prefabricated, U-shaped, unpunched web, thickness to match studs, made from G40 hot-dip galvanized coated sheet. ICC-ESR 3064P.

B. Stud Gauges indicated on drawings or specified above are minimum. Where required stud height exceeds Code approvals or manufacturer's recommendations, provide heavier gauge studs and/or decrease stud spacing as necessary to conform to code approvals, at no additional contract cost.

C. Suspended Ceiling Systems and Wall Furring: Suspended ceiling framing system shall have the capability to support the finished ceiling, light fixtures, air diffusers, and accessories, as shown. The suspension system shall have a maximum deflection of L/240. Carrying channels shall be formed from minimum 0.0548" thick cold-rolled steel, 1-1/2" wide by 7/16" deep. Carrying channels for supports under ducts shall be 2" in size as specified hereafter. Carrying channels shall be made from hot-dip galvanized coated sheet. Furring members shall be formed from cold-rolled steel, 7/8" by 2-9/16". Furring members shall be made from hot-dip galvanized coated sheet.

D. Framing Accessories: Provide all standard related accessories including floor and ceiling tracks, clips, web stiffeners, anchors, and similar items, of the same manufacture as each type of stud specified, as required for complete installations.

E. Splay Wires and Compression Struts: Of approved manufacturers, acceptable to manufacturer of ceiling grids, gauges and types as required by building codes for ceiling types and weights specified.

F. Wires: Soft-annealed galvanized steel wire, 8 gauge for hanger wires and 16 gauge for framing unless otherwise specified.

G. Fasteners: Wafer head screws, self drilling type for 20 gauge metal and heavier.

H. Acoustical Foam Tape: Compressible, closed cell polyvinyl chloride foam with pressure sensitive adhesive, in rolles with protective release liner on non-adhesive face, 6 pcf density, 1 " wide by not less than 1/4" thick, Norseal V730, manufactured by Norton Performance Plastics Corporation (800) 724-0883, or equal.

I. Acoustical Sealant: By USG, Gold Bond, or equal, permanently resilient type.

J. Zinc-Rich Paint: Conform to Fed Spec DOD-P-21035A, Z.R.C. "Cold Galvanizing Compound", manufactured by ZRC Products Company. Use for touch-up of galvanized surfaces.

K. Steel Backing Plates: Fabricate of minimum 4" wide by 16 gauge steel, or sections of studs and stud track welded to web of studs, except as otherwise indicated. Apply shop coat of metal primer.

3.00 EXECUTION

3.01 GENERAL

A. Conform installation of light gauge steel framing and furring to requirements of ASTM C 754 and ASTM C 841 except conform to this section where more stringent requirements are specified. ICC-ESR 3064P.

3.02 INSTALLATION OF STUD TRACKS

A. Bolt or screw fasten to metal and anchor at least 1-1/4" into concrete with bolts and expansion shields, shotpins, cinch anchors, screws and lead plugs, drilled and bolted steel shells, or other approved device. Concrete nails are not acceptable. Abutting lengths of track shall be securely anchored to a common structural element, butt-welded or spliced. Secure all tracks within 6" of ends and at maximum 24" centers between unless otherwise indicated.

3.03 WALL FRAMING AND FURRING

A. Provide 18 gauge studs at maximum 16" centers typically, unless otherwise shown, specified, or required under Subparagraph "Stud Height". Cut studs 1/2" short and secure to top track in manner that allows for deflection of structure above. Steel framing and furring members shall be installed in accordance with ASTM C 754 and as specified herein. Members shall be in alignment. Runners shall be aligned accurately at the floor and ceiling and securely anchored.

B. Wall Openings: The framing system shall provide for the installation and anchorage of the required subframes or finish frames for wall openings at doors, pass-through openings, and access panels. Partitions abutting continuous suspended ceilings shall be strengthened for rigidity at rough openings of more than 30" wide. Studs at openings shall be 14 gauge minimum thickness and spot grouted at jamb anchor inserts. Double studs shall be fastened together with screws and secured to floor and overhead runners. Form heads and sills of openings with track sections screwed or bolted to jamb studs, unless otherwise shown. Steel framing and furring members shall be installed in accordance with ASTM C 754. Members shall be in alignment. Runners shall be aligned accurately at the floor and ceiling and securely anchored.

C. Control joints for expansion and contraction in the walls shall be constructed with double studs installed 1/2" apart in interior walls or wall furring where indicated on drawings. Control joint spacing shall not exceed 30'. Ceiling-height door frames may be used as vertical control joints. Door frames of less than ceiling height may be used as control joints only if standard control joints extend to ceiling from both corners of top of door frame. Control joints between studs shall be filled with fire-safing insulation in fire rated partitions.

D. Studs at Wall Mounted Items: Install 14 gauge studs wall-hung casework, fixtures and equipment, and elsewhere as shown.

E. Studs at Ceramic Tile: Studs for use with ceramic tile shall be not lighter than 16 gauge. Spacing of studs for ceramic tile shall not exceed 16" when tile is thinset over portland cement backer board, and 12" when mortar set over portland cement plaster.

3.04 SOUND INSULATED WALLS AND PARTITIONS

A. Embed floor runner tracks in two beads of acoustical sealant or two strips of compressed tape seal. Install the top track in same manner for full-height insulated walls. Where wail ends abut concrete, masonry, or steel, set end studs in two beads of acoustical sealant or two tape seals and secure at 4-foot centers vertically. At irregularities in surfaces, provide additional layers of sealant or tape as required to obtain compression.

B. Embed floor runner tracks in two beads of acoustical sealant or two runs of compressed tape seal. Install the top track in same manner for full-height insulated walls.

3.05 SUSPENDED CEILINGS AND FURRING

A. Hanger Wires: Secure to structure above according to code and approved submittal. Allow sufficient length for two or more complete turns around runner channels at proper ceiling height.

B. Suspended Gypsum Wallboard Framing: Suspended ceiling system framing shall be installed in accordance with ASTM C 754, and as follows.

1. Hangers shall be spaced not more than 48" along runner channels and 36" in the other direction or 42" in both directions unless otherwise indicated. Locations of hanger wires shall be coordinated with other work. Hangers at ends of runner channels shall be located not more than 6" from walls. Hanger wire shall be secured to structural elements with suitable fasteners. Sags or twists which develop in the suspended system shall be adjusted. Damaged or faulty parts shall be replaced.

2. Main Runners: Hanger wires shall be double strand saddle-tied to runner channels and the ends of hanger wire shall be twisted three times around itself. Main runners shall be located to within 6" of the parallel wall to support the ends of cross furring. Main runners shall not come in contact with abutting masonry or concrete walls. Where main runners are spliced, ends shall be overlapped 12" with flanges of channels interlocked, and shall be securely tied at each end of splice with wire looped twice around the channels.

3. Furring channels shall be secured to the runner channels and to structural supports at each crossing saddle-tied with one strand of #16 gage or two strands of #18gage tie wire. Furring channels shall be located within 2" of parallel walls and beams, and shall be cut 1/2" short of abutting walls.

4. Ceiling Openings: Support members shall be provided as required at ceiling openings for access panels, recessed light fixtures, and air supply or exhaust. Support members shall be not less than 1-1/2" main runner channels and vertically installed suspension wires or straps shall be located to provide at least the minimum support specified herein for furring and

wallboard attachment. Intermediate structural members not a part of the structural system, shall be provided for attachment or suspension of support members.

5. Light fixtures and air diffusers shall be supported directly from suspended ceiling runners. Wires shall be provided at appropriate locations to carry the weight of recessed or surface mounted light fixtures and air diffusers.

6. Control Joints: Ceiling control joints for expansion and contraction shall be located where indicated on drawings or on approved submittals. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.

C. Splay Wires and Compression Struts: Install as detailed and as required to prevent upward and sideward motion under seismic conditions, as required by code.

D. Suspension Under Ducts: For hangers spaced at 4 to 5-1/2 foot centers, provide 6 gauge hanger wires with minimum 2" runner channels spaced at maximum 48" centers. For greater spans, design system for live load of 10 pounds per square foot of area plus dead load and detail in shop drawings.

E. Furring: Provide framing for horizontal furring as shown and required. Conform to above requirements as applicable.

3.06 BACKING PLATES AND ANCHORAGE

A. Install and attach to metal studs or furring for anchoring items indicated or specified in other sections. Comply with approved submittals specified under other sections as applicable to steel backing plates. Backing plates may be omitted where anchorage for wall-hung items is directly into steel studs of 18 gauge or heavier, or items are furnished with equivalent mounting devices. Install plates of lengths to span over at least two supports, equipped with two countersunk machine screws at each support except plates may be welded to supports 18 gauge or heavier. Wall-mounted items requiring backing plates include without limitation the following:

Grab bars
Toilet compartments and urinal screens
Toilet room accessories
Plumbing fixtures
Steel ladders

3.07 CONNECTIONS TO METAL DECKING

A. Provide premolded neoprene filler strips matching the flute profile for walls and partitions covered on one or both sides up to metal decking. If proprietary fire-rated top tracks are used, the installation shall be in accordance with manufacturer's recommendations.

3.08 TOUCH-UP PAINTING

A. Spot prime all abraded and damaged areas of zinc coating as specified.

END OF SECTION

SECTION 09 24 00
LATH AND PORTLAND CEMENT STUCCO

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Portland Cement, Pre-blended Scratch and Brown Coat Stucco.
2. Portland Cement, Pre-blended Fiber Base Coat Stucco.
3. Portland Cement, Painted Finish Coat Stucco.
4. Metal Lath and Lathing Accessories.

1.03 RELATED SECTIONS

A. Section 03 30 00 – Cast-in-Place Concrete.

B. Section 04 23 00 – Reinforced Unit Masonry

C. Section 06 10 00 – Rough Carpentry.

D. Section 07 25 00 – Weather Barriers.

E. Section 07 90 00 – Joint Sealers.

F. Section 09 22 16 – Non-Structural Metal Framing.

G. Section 09 90 00 – Painting.

1.04 REFERENCES

A. American National Standards Institute (ANSI) / American Hardboard Association (AHA):

1. ANSI/AHA A 194 - Cellulosic Fiber Board.

B. ASTM International (ASTM):

1. ASTM A 641/A 641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
2. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
4. ASTM C 150 - Standard Specification for Portland Cement.
5. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.

6. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.

7. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

8. ASTM C 595 - Standard Specification for Blended Hydraulic Cements.

9. ASTM C 847 - Standard Specification for Metal Lath.

10. ASTM C 897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters.

11. ASTM C 926 - Standard Specification for Application of Portland Cement-Based Plaster.

12. ASTM C 932 - Standard Specification for Surface-Applied Bonding Agents for Exterior Plastering.

13. ASTM C 933 - Standard Specification for Welded Wire Lath.

14. ASTM C 954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

15. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete.

16. ASTM C 1002 - Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

17. ASTM C 1032 - Standard Specification for Woven Wire Plaster Base.

18. ASTM C 1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster.

19. ASTM C 1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

20. ASTM C 1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units.

21. ASTM C 1328 - Standard Specification for Plastic (Stucco) Cement.

22. ASTM C 1396 - Standard Specification for Gypsum Board.

23. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

C. Federal Specification (FS):

1. FS UU-B-790a - Building Paper, Vegetable Fiber: (Kraft, Waterproofed, Water Repellant and Fire Resistant).

D. ICC Evaluation Service, Inc. Code Report

1. ICC-ES AC11 Cementitious exterior wall coatings.

1.05 SYSTEM DESCRIPTION

A. Concrete: 2-coat, Portland cement plaster applied over concrete consisting of the following:

1. 2-coat plaster system.

a. 3/8”- 1/2” Spec Mix Fiber Base Coat (FBC).

b. Spec Mix Finish Coat.

B. Concrete Block, CMU Substrate: 2-coat, Portland cement plaster applied over concrete block consisting of the following:

1. 2-coat plaster system.

a. 3/8”- 1/2” Spec Mix Fiber Base Coat (FBC).

b. Spec Mix Finish Coat.

C. Plywood Sheathing Substrate: 3-coat, Portland cement plaster applied over wood studs and plywood sheathing consisting of the following:

1. Building paper applied over sheathing.

2. Self-furring metal lath.

3. 7/8 inch thick nominal , 3-coat plaster system.

a. Scratch coat: 3/8”- 1/2” Spec Mix Scratch & Broom Fiber Reinforced.

b. Brown coat: 3/8”- 1/2” Spec Mix Scratch & Broom Fiber Reinforced.

c. Painted Smooth Finish Coat.

1.06 SUBMITTALS

A. Submit under provisions of Section 01340 – Submittal Procedures.

B. Product Data: Submit manufacturer's product data.

C. Samples: Submit selection and verification samples of colored finish coat stucco.

D. Warranty: Submit stucco system warranty.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm specializing in manufacture of pre-blended stucco materials, with minimum 10 years’ experience.

B. Applicator: Firm specializing in the application of pre-blended stucco materials, with minimum 10 years’ experience.

C. Regulatory Requirements: Conform to applicable code requirements for finish system.

D. Mock-Up: Provide a mock-up of each type of stucco installation, using materials and systems specified in this Section; include at least one example of each type of accessory material.

1. Construct mock-up in locations as indicated on drawings.

2. Indicate texture, color and workmanship of finished work.

3. Proceed with work only after the mock-up has been approved.

4. Maintain the mock-up on site and remove at the completion of the project.

E. Designing and Detailing:

1. Follow the stucco manufacturer's written installation instructions, published details, and technical information in the design of the stucco systems.

2. Sealants and backer rod are required at dissimilar materials and expansion joints within the stucco system to provide a watertight system.

3. Minimum slope for all projections shall be 1;2 with a maximum length of 12" (30.5cm).

F. Substrate Systems:

1. Deflection of the substrate systems shall not exceed L/360.

2. Acceptable substrates for stucco systems are water-resistant core exterior grade gypsum sheathing (ASTM C1396), Dens-Glass Gold® sheathing (ASTM C1177).

G. System Joints:

1. Expansion joints in the system are required at building expansion joints, at prefabricated panel joints, where substrates change and where structural movement is anticipated. Control joints are required at a minimum of every 144 ft. (13 sq. m) of wall surface area and where specified by the design professional. The maximum uncontrolled length or width is 18 lineal feet (5.5 lineal meters) and a maximum uncontrolled length to height ratio of 2-1/2:1.

H. Pre-Installation Meeting: At least three weeks prior to commencing stucco work, conduct a meeting at the project site to discuss contract requirements and job conditions; require the attendance of stucco installation contractor and installers of related materials; notify Architect in advance of meeting.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products under provisions of section 01600.

B. Deliver stucco materials in original unopened packages with manufacturer's labels intact.

C. Protect stucco materials during transportation and installation to avoid physical damage.

D. Store stucco materials in cool, dry place protected from freezing.

E. Handle all products with appropriate precautions and care per MSDS.

1.09 PROJECT CONDITIONS

A. Comply with ASTM C 926 requirements.

B. Do not apply stucco materials in ambient temperatures below 4°C/40°F. Provide supplementary heat during installation and drying period when temperatures less than 4°C/40°F prevail.

C. Do not apply stucco materials to frozen surfaces.

D. Maintain ambient temperature at or above 4°C/40°F during and at least 24 hours after stucco installation and until dry.

1.10 SEQUENCING AND SCHEDULING

A. Coordinate and schedule installation of the stucco materials with related work of other sections.

B. Coordinate and schedule installation of trim, flashing, and joint sealers to prevent water infiltration behind the system.

1.11 WARRANTY

A. Provide a stucco system warranty based on the information provided by the applicator or the distributor following the completion of the system.

B. Comply with Spec Mix® project review requirements and notification procedures to assure qualification for warranty.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Spec Mix®, Inc., which is located at: 1230 Eagan Industrial Road, Suite 160, Eagan, MN 55121; Toll Free Tel: 888-SPEC-MIX (773-2649); Tel: 651-994-7120; Email: request info (info@specmix.com); Web: www.specmix.com

B. Obtain products from a single manufacturer.

2.02 METAL LATH

A. Expanded diamond mesh lath weighing 3.4 lbs./sq.yd. made from uncoated or zinc-coated (galvanized) steel sheet to produce lath complying with ASTM C 847, with uncoated steel sheet painted after fabrication, by Western Metal Lath, Amico West, or Cemco.

1. On solid surfaces, use self-furred lath.

2.03 PLASTER MATERIALS

A. Scratch & Brown Pre-Blended Stucco: SPEC MIX Scratch & Brown Pre-Blended Stucco is a dry pre-blended cement based stucco mix containing Portland cement, hydrated lime, sand, aggregates and performance admixtures formulated to be used in a three coat or a two coat application.

1. Applicable Standards: ASTM C 144, ASTM C 150, ASTM C 207, ASTM C 270, ASTM C 595, ASTM C 897, ASTM C 926, ASTM C 1328.

B. Fiber Base Coat Pre-Blended Stucco: SPEC MIX Fiber Base Coat (FBC), Pre-Blended Stucco is a dry pre-blended cement based stucco mix containing Portland cement, hydrated lime, polyester and fiberglass fibers, sand, aggregates and performance admixtures formulated to be used in a three coat or a two coat application.

1. Applicable Standards: ASTM C 144, ASTM C 150, ASTM C 157, ASTM C 207, ASTM C 348, ASTM C 595, ASTM C 897, ASTM C 926, ASTM C 1328.

C. Colored Finish Coat Stucco: SPEC MIX Colored Finish Coat Stucco is a dry pre-blended cement based stucco mix containing Portland cement, hydrated lime, sand, aggregates and performance admixtures formulated for optimum workability and reduced shrinkage.

1. Applicable Standards: ASTM C 144, ASTM C 150, ASTM C 207, ASTM C 270, ASTM C 595, ASTM C 897, ASTM C 926, ASTM C 979, ASTM C 1328.

2. Pigments:

a. Natural and synthetic, milled, blended iron oxides.

b. Carbon added for darker colors shall not exceed 4 percent.

c. Produce uniform and consistent color.

d. Inert, stable to atmospheric conditions, sunfast, weather resistant, alkali resistant, water insoluble, lime proof and non-bleeding.

e. Free of deleterious fillers and extenders.

3. Color: As selected by Architect to match existing buildings on site.

2.04 ACCESSORIES

A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Lathing Accessories:

1. Formed from minimum 26 gage hot-dip, G 60 galvanized steel furnished in longest possible single length.

a. Control joints Expanded Flange: Western Metal Lath No. XJ15-3.

b. Casing Bead Expanded Flange: Western Metal Lath No. 66.

c. Corner Reinforcement: Western Metal Lath Stucco-Lok.

d. Base and Soffit Screed: Superior Metal Products No. 5.

2. Formed from extruded aluminum, alloy 6063 T5, with anodized finish, furnished in longest possible lengths. Factory fabricate intersections with back-up plates and legs at least 24 inches long. Provide end caps where required. Anodized finish color selected by Architect.

a. Drip Screed: Fry Reglet Corp. DS_875-875.

b. J Moldings: Fry Reglet Corp. JDM-100.

c. Vent Screed: Fry Reglet Corp. WPM-75-V-400.

C. Secondary Weather Barrier for Lath:

1. See Specification Section 07 25 00 (Tyvek Commercial Wrap).

D. Flexible Flashing: 9 inches wide, 20 mil thick, self-sealing, self-healing rubberized asphalt laminated to a polyethylene film. Use over weather barrier at rough openings.

2.05 MISCELLANEOUS MATERIALS

A. Water: Clean and potable without foreign matter.

B. Bonding Compound: Complying with ASTM C 932 and as recommended by Spec Mix® Inc.

C. Fasteners for Lath to Steel Framing: Screws for metal stud installation shall be self drilling, self tapping #8 shank, 7/16-inch diameter pan washer head screws with a minimum penetration into the metal stud of 3/8 inch. Screws shall be located at each furring device (rib) at a maximum 6 inches o.c. along stud or rafter supports.

D. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.

E. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch (1.21-mm) diameter.

F. Sealant: Sealant: As specified in Section 07 90 00 - Joint Sealants.

3.00 EXECUTION

3.01 EXAMINATION

A. Examine areas and substrates, with Installer present, and including hollow-metal frames, cast-in anchors, structural framing, and lath for compliance with requirements and other conditions affecting performance of the Work.

B. Substrates:

1. Verify that acceptable substrates have been installation. Refer to Quality Assurance Article above.

2. Wall sheathings must be securely fastened per applicable building code requirements.

3. Examine surfaces to receive system and verify that substrate and adjacent materials are dry, clean, and sound. Verify substrate surface is flat, free of fins or planar irregularities greater than 1/4" in 10'-0”.

C. Flashings:

1. Heads, jambs and sills of all openings must be flashed with a minimum 9" strip of flexible flashing prior to window/door, HVAC, etc. installation.

2. Windows and openings to be flashed according to design and building code requirements.

3. Individual windows that are ganged to make multiple units require continuous head flashing and/or the joints between the units must be fully sealed.

D. Utilities:

1. The system must be properly terminated (back-wrapped, sealed, flashed) at all lighting fixtures, electrical outlets, hose bibs, vents, etc. Refer to Spec Mix® Inc., typical Details.

E. Secondary Moisture Barrier:

1. Verify that the secondary moisture barrier is installed over the substrate per applicable building code requirements, manufacturer's specifications and Spec Mix® Inc. typical Details prior to stucco application.

F. Roof:

1. Verify that all roof flashings have been installed in accordance with the guidelines set by the Asphalt Roofing Manufacturers Association (ARMA) and project design documents.

G. Weep Screed / Kick-out Flashing:

1. Verify that Weep Screeds and Kick-out Flashings are installed where required prior to the stucco application. The flashing must be leak-proof and angled (min 100°) to allow for proper drainage and water diversion. Refer to Spec Mix® Inc. typical Details.

H. Do not proceed with stucco work until surfaces and conditions comply with requirements indicated in referenced installation standard and manufacturer's printed instructions.

3.02 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering work.

3.03 SECONDARY MOISTURE BARRIER INSTALLATION

A. Install secondary moisture barrier horizontally, overlapping in shingle pattern with 6" edge and end lap. Fasten to sheathing with corrosion-resistant staples. Secondary moisture barrier to be installed over all sheathing to receive plaster finish.

3.04 INSTALLATION, GENERAL

A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.

3.05 INSTALLING METAL LATH

A. Metal Lath: Install according to ASTM C 1063.

1. Install metal lath with minimum 1-1/2" side and end laps.

2. When end laps occur between supports, lace or wire ties the ends of the sheets with galvanized steel wire.

3. Corrosion-resistant fasteners for lath attachment to penetrate a minimum 1" into wood framing.

4. Secure lath is to metal framing using No.8-18, S-12, pan head, self-tapping screws spaced a maximum of 6 inches vertical on center to studs.

3.06 INSTALLING ACCESSORIES

A. General:

1. Install trim in accordance with manufacturer's specifications.

2. Install trim components in longest piece length possible to minimize joints.

3. Allow 1/8 inch - 3/16 inch gap between the abutting trim pieces. Do not overlap trim.

4. Set intersection of trim in a minimum 4" bed of trim sealant approved by Spec Mix®, Inc.

5. Miter all corners at intersections of trim.

6. Install according to ASTM C 1063 and at locations indicated on Drawings or as follows.

B. Reinforcement for External Corners:

1. Install corner bead at exterior corner locations.

C. Control Joints: Install control joints at locations indicated on Drawings and as follows:

1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:

a. Vertical Surfaces: 144 sq. ft.

b. Horizontal and other Non-vertical Surfaces: 100 sq. ft.

2. At distances between control joints of not greater than 18 feet o.c.

3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.

4. Where control joints occur in surface of construction directly behind plaster.

5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.07 PLASTER MIXING

A. General:

1. Comply with ASTM C 926 for applications indicated.

2. Mix pre-packaged stucco materials with clean water to comply with manufacturer's written instructions.

3. No additives are permitted unless specified in product mixing instructions. Close containers when not in use. Prepare in a container that is clean and free of foreign substances. Do not use a container which has contained or been cleaned with a petroleum-based product. Use a mixer which is clean and free of foreign substances. Clean tools with soap and water immediately after use.

B. Bag Mixing Spec Mix® Stucco: 80 lb. Bag.

1. Place 1.2-1.5 gallons of potable water into the mixer for each 80 lb. bag.

2. Slowly pour the contents of the bag(s) into the mixer.

3. Mix for 4 to 5 minutes and then let the mixture slake for 3 to 4 minutes.

4. Re-mix to break the initial set and add small amounts of water to adjust the consistency.

a. Do not exceed a total volume of 2 gallons of water for each 80 lb. bag.

5. Mixing time and procedures should be consistent with every batch for consistent material.

6. Prepare only enough mix as can be applied in one hour.

C. Silo System Mixing Spec Mix® Stucco:

1. Place 75% of the needed water into the mixer. A double mixer batch requires approximately four full 5 gallon pails.

2. Pull open the silo handle to dispense the Spec Mix stucco product into mixer.

3. Mix for 4 to 5 minutes and then let the mixture slake for 3 to 4 minutes.

4. Re-mix to break the initial set and add small amounts of water to adjust the consistency.

5. Mixing time and procedures should be consistent with every batch for consistent material.

6. Prepare only enough mix as can be applied in one hour.

3.08 PLASTER APPLICATION

A. Apply plaster materials in accordance with manufacturer’s written installation instructions for the specific systems indicated.

B. General: Comply with ASTM C 926.

1. Apply cement plaster with sufficient force to develop full adhesion between plaster and the substrate.

2. Apply the base coat to completely embed lath or wire and to completely fill the thickness of the casing, screeds, or expansion/control joint.

3. It is acceptable to use the double back method of application, whereby the first pass of base coat covers the lath or wire and the second pass of base coat fills in the casing, screed, or control/expansion joints.

4. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.

5. Once the base coat has been applied to the required thickness, a rod should be used to level the base coat with screeds, to provide a true, flat plane. Follow this by wood floating or darbying the surface. Fill all voids and dress surface for the finish coat.

    a. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface.

6. Allow base coat stucco to achieve its initial set (2-4 hours) prior to moisture curing. Moisture cure for at least 48 hours by lightly and evenly fogging the surface with water at least twice a day. Direct sunlight, hot temperatures, low humidity and wind may make additional fogging necessary.

3.09 PLASTER REPAIRS

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.10 CLEANING

A. Clean stucco material from adjacent surfaces as recommended by manufacturer.

B. Remove surplus material and debris, including field sample, from site.

3.11 PROTECTION

A. Protect installed stucco surfaces from rain, snow and frost for 48–72 hours following application.

END OF SECTION

SECTION 09 25 00
GYPSUM BOARD

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Principal Work in this Section:

1. Gypsum board.

2. Metal suspension and furring assemblies.

3. Fasteners, joint reinforcing and finishing compound.

B. Related Work:

1. Metal Support Systems – Sections 05 40 00 and 09 22 16 (except for framing specified herein).

2. Metal Backing Plates and Access Panels in Gypsum Board Surfaces: Reference Sections 08 31 00 and 09 22 16.

3. Cement Backerboard: Section 09 25 50.

a. Behind all tile areas with thin set or plaster setting bed.

1.03 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Comply with fire resistance ratings indicated and required by Code.

2. Provide materials, accessories and application procedures listed by UL or tested in compliance with ASTM E 119 for the type of construction shown.

B. Mock-Up:

1. Where directed construct a mock-up of a gypsum board wall and ceiling inside the building. Make mock-up full height (minimum 8 ft. high x 8 ft. wide) with a 4 ft. return.

2. Tape and finish joints, trim and screw heads as specified for Level 5 herein. Refer to Section 09900 for painting of the mock-up with a semi-gloss paint.

3. The Architect will review the mock-up under various light conditions for defects and improperly finished joints, trim and screw heads. Provide a portable light for that purpose when so requested.

4. Make corrections requested by the Architect, or remove and replace mock-up when the corrective work is not acceptable to the Architect.

5. The approved mock-up shall remain in the building until its removal is directed, and will be used as a standard for the gypsum board work for the Project.

1.04 HANDLING

A. Procedure: In accordance with Section 01600.

B. Delivery:

1. Coordinate delivery with installations to minimize storage periods at the site. When stored outdoors, place on skids off the ground, and cover with waterproof tarpaulins. Neatly stack gypsum panels flat to prevent sagging.

2. Deliver fire-rated materials with UL label and required fire classification numbers clearly visible.

C. Handling: Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal trim.

D. Storage: Do not overload the floors with localized concentration of gypsum board.

1.05 JOB CONDITIONS

A. Comply with the gypsum board manufacturer's recommendations for temperature limitations and ventilation before, during and after installation of gypsum board.

B. Protect installed materials from drafts during hot, dry weather.

C. Illuminate work areas during installation to provide the same or greater level of illumination, as required to properly perform the work, as will occur in the room or space after the building is in operation.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Goldbond Building Products/Div National Gypsum Co., US Gypsum Co., Georgia-Pacific Corp., Domtar Gypsum or Louisiana-Pacific.

2.02 MATERIALS

A. Gypsum Board: Provide gypsum board in maximum lengths available to minimize end-to-end butt joints. Unless otherwise acceptable to the Architect, no end-to-end joints are permitted on walls or ceilings under 12 ft. in length or width.

1. Exposed Gypsum Board Surfaces (5/8" Type 'X'): ASTM C 36, with paper face suitable to receive decorated finish, and long edges tapered to receive joint compound. Impact Resistant type typical unless noted otherwise.

B. Suspended and Furring Products:

1. Resilient Channel: 25 gauge 1/2” x 2-1/2”. Secure with Type W or S 1-1/4” long drywall screws only.

2. Furring Channel: 25 gauge x 7/8” x 2-3/4” hat section with 1-3/8” face width, with clips.

3. Runner Channels: Cold rolled steel 1-1/2” x .1.12 pounds per foot – 1/8” thick.

4. Tie Wire: Galvanized, annealed 18 gauge.

5. Reinforcing Channel: Cold rolled steel 3/4” x .300 pounds per foot – 1/8” thick.

C. Fasteners:

1. Screws: ASTM C-1002 or ASTM C-954.

a. Type S for light gauge steel framing and furring.

b. Type S-12 for heavier gauge steel framing (to 12 gauge max). Buildex S-12 pan head for securing membrane.

c. Type G for attaching gypsum board to gypsum board.

d. Note: Gypsum sheathing required item 2.03C.2. at all metal connections.

2. Adhesives:

a. Gypsum Board to Metal or to Gypsum Board: As recommended by the gypsum board manufacturer.

D. Joint Tape, Compound and Laminating Adhesive: ASTM C 475, the following by Hamilton Materials or one of the gypsum board manufacturers.

1. Taping, and fastener and metal trim concealment: Multi-Purpose Compound V.

2. Topping, Finish and Skim Coats: Topping Joint System.

E. Sealant: As specified in Section 07900.

3.00 EXECUTION

3.01 INSPECTION / PREPARATION

A. Verify conditions and measurements affecting the work of this Section at site. Make sure that detrimental conditions are corrected before proceeding with installation.

B. Before enclosing stud walls, thoroughly clean sill of debris.

3.02 GYPSUM BOARD INSTALLATION

A. General: Comply with the applicable provisions of ASTM C 840, Application and Finishing of Gypsum Board, ASTM E 497, Installing Sound Isolating Lightweight Partitions, GA-216, and the following.

1. Use only full size boards above door and window openings, joints at corners of heads are not acceptable.

2. Minimize butt joints and avoid butt joints centered on walls, over protruding studs, and above doors and windows. Avoid abutting end joints in the central area of each ceiling.

3. Provide perimeter relief where board abuts structural decks, ceilings, vertical structural elements, or windows.

4. Install horizontal board first. Butt joints between boards loosely. Do not force boards into place. Place tapered or wrapped edges next to one another.

5. Attach boards to all studs and furring members with power-driven screws securely engaging supporting member, and with fastener heads uniformly depressed not over 1/32 in. below surface of board (except for first layer of multiple layer assembly) without breaking face paper. Space fasteners in accordance with Table 25 A-G or 25 A-H of the CBC.

6. After boards have been installed over screws and backing plates, tap boards with a rubber mallet to depress backside of board over heads to eliminate unacceptable bulges.

7. Allowable Tolerances:

a. Do not exceed 3/16 in. in 8 ft., and 1/8 in. 4 ft. from plumb, level and flat (all directions) in gypsum board surfaces.

b. Do not exceed 1/16 in. offset at joints between boards.

c. Shim boards as necessary to comply with these tolerances.

B. Single Layer Application:

1. Horizontal Surfaces:

a. Install board with long dimension at right angle to supports, with end joints located over supports.

b. Use maximum practical length boards to minimize end joints. Stagger end joints in alternate boards.

c. Where water-resistant (WR) boards are used for horizontal surfaces, framing must be spaced at not over 12 in. o.c. maximum.

2. Vertical Surfaces:

a. Unless otherwise acceptable to the Architect, install board vertically. Use floor-to-ceiling length boards (unless height exceeds 12 ft.) with vertical joints located over supports.

b. Offset joints at least one stud on opposite sides of partition/walls.

c. Extend gypsum board continuously from finish floor to underside of structure above, except where indicated otherwise on the Drawings.

3.03 ERECTION OF SUSPENDED FRAMING

A. Space hangers not over 3'-0" o.c. in the direction of the 1-1/2" main runner channels and not over 4'-0" o.c. in the direction at right angles to the main runners and within 6" of main runner ends and of boundary walls, girders or similar interruption of ceiling continuity.

B. Install main runners not over 4'-0" o.c., properly positioned, level and saddle tie hangers along runners. Main runner shall not come in contact with abutting walls. Space runner channels within 6" of adjacent walls to support ends of the furring channels.

C. Space drywall furring channels 16" o.c. and securely clip or saddle tie with two strands of tie wire to main runners. Provide end splices by nesting channels no less than 8", and securely wire tie.

D. All light or other openings that interrupt the main runner or furring channels, reinforce grillage with 3/4" cold rolled channels wire tied atop and parallel to main runner channel.

3.04 FINISHING

A. Finish gypsum board surface with exposed joints, corners and edges reinforced or trimmed in compliance with the following:

Level 0: No taping, finishing or accessories required.

Use: First layer of multiple layer construction.

Level 1: Joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

Use: In plenum areas above ceilings, in attics, and in areas where the assembly will generally be concealed.

Level 2: Not used.

Level 3: Not used.

Level 4: Joints and interior angles shall have tape embedded in joint compound and 3 separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges.

Use: In areas where light textures or backed lightweight wall coverings are to be applied.

Level 5: Joints and interior angles shall have tape embedded in joint compound and 3 separate coats of joint compound applied over joints, angles, fastener heads, and accessories. A thin skim coat of joint compound, or a material similar to USG First Coat shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.

Use: All other areas to be painted.

B. General:

1. Fill joints, fastener heads, trim accessory flanges and surface defects with joint compound in compliance with the gypsum board manufacturer's recommendations to obtain a smooth, flush surface.

2. All joints, fastener heads and trim flanges in surfaces which will remain exposed to view in the building, shall be invisible after application of joint tape and compound.

C. Install trim in single unjointed length, unless length exceeds manufacturer's standard. Attach to gypsum board in compliance with manufacturer's printed instructions.

1. Install Type CB trim at external corners.

2. Install Type LC trim where gypsum board edges are exposed in the finish work.

3. Install Type CB or LC trim where gypsum board abuts a different material, and the edges are not covered by a finish material.

4. Install control joints as recommended in paragraph 5.6 of the reference standard. Joint locations are subject to the Architect's approval.

D. Reinforce joints between gypsum boards, and interior corners and angles with tape set in joint compound.

1. Apply skim coat over tape in one application.

2. Where space greater than 1/16 in. occurs between abutting gypsum boards (except at control joints), prefill joints with joint compound and allow to dry before applying joint tape.

3. Reinforce door frame jamb anchors, of openings scheduled to receive wood and metal doors, by spot-grouting with joint compound.

E. Joint Compound:

1. Lap each coat not less than 4 in. over the preceding coat (2 in. on each edge). Width of joint compound on tapered board edges shall be not less than 12 in.; width of joint compound on square board edges not less than 18 in.

2. Allow at least 24 hours drying time between applications of joint compound.

3. Finish joint compound so that little or no sanding is required. When sanding, use sandpaper or mesh cloth with grit as fine as possible; do not scuff face paper. Remove all sanding dust before painting or applying other finishes.

F. Leave gypsum board surfaces smooth, undamaged and ready to receive scheduled finishes.

3.05 MECHANICAL AND ELECTRICAL WORK

A. Coordinate with Mechanical and Electrical trades in the location and installation of their work. Provide bridging, bracing and support their work installed in or on drywall construction. Do not close both faces of walls until their installations have been inspected and approved. Provide fire assembly enclosures for mechanical and electrical equipment which penetrates fire-rated assemblies.

3.06 ACCESS PANELS

A. Access panels for access to electrical or mechanical controls and valves which occur in drywall partitions or furring will be furnished to the job by the trade involved for installation under this Section. Locate panels where directed by the Architect and install level and square with adjacent construction.

B. Refer to the Mechanical and Electrical Drawings and Specifications for additional requirements.

END OF SECTION

SECTION 09 25 50
CEMENT BACKERBOARD

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Principal Work in this Section:

1. Cement backerboard all toilet room locations with wall tile.

2. Joint tape.

1.03 SUBMITTALS

A. Procedure: In compliance with Division 01.

B. Data: Manufacturer's data for board proposed to use and installation instructions.

1.04 HANDLING

A. Procedure: In compliance with Division 01.

1.05 JOB CONDITIONS

A. Provide adequate ventilation to dissipate excess moisture.

B. Before installation of the backerboard allow wood framing to stand in its normal service environment for as long as possible. Do not install backerboard when it is wet.

2.00 PRODUCTS

2.01 MATERIALS

A. Cement Backerboard: One of the following furnished in longest available length to minimize end joints.

1. Gold Bond Building Products Glas-crete Cementitious Backerboard, 1/2 in. thick.

2. US Gypsum Co. Durock 1/2 in. thick.

3. Custom Building Products WonderBoard, 1/2 in. thick.

B. Joint Reinforcement: Alkali-resistant, 2 in. wide, coated fiberglass mesh tape.

C. Fasteners: Type S Hi-Lo thread, galvanized Bugle head screws x 1-1/4 in. long.

D. Washers: 3/4 in. diameter, countersunk, stainless steel washer for use where panels abut over a framing member.

E. Bonding Materials:

1. Dry-set mortar meeting ANSI A118.1 standards.

2. Latex Portland cement mortar meeting ANSI A 118.4 standards.

3. Dry-set mortar modified with acrylic latex additive.

F. Grout: Portland cement grout meeting ANSI A118.6.

3.00 EXECUTION

3.01 INSPECTION

A. Verify conditions and measurements affecting the work of this Section at site. Make sure that detrimental conditions are corrected before proceeding with installation.

3.02 INSTALLATION

A. General:

1. Comply with the board manufacturer's printed installation instructions and the following.

2. Use longest possible board length for each application.

B. Walls:

1. Preparation: Edges of board parallel to framing shall be continuously.

2. Board Installation:

a. Precut panels and make accurate cutouts for penetrations.

b. Install board leaving a 1/8 in. to 3/16 in. space at all joints and corners. Stagger board joints with those of adjacent rows.

c. Fasten board every 8 in. o.c. in field and within 1/2 in. to 2 in. of edges around backerboard perimeter.

d. Where open mesh wrapped edges meet fill gap completely with bonding material. On all other joints and corners pre-fill gap with bonding material then imbed 2 in. mesh tape and smooth material over joint and corner.

END OF SECTION

SECTION 09 31 00
CERAMIC TILE

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Principal Work in this Section:

1. Shower stall ceramic floor tile and Wall tile, and trim shapes.

2. Locker room ceramic wall tile wainscot.

3. Restroom ceramic wall tile.

4. Setting materials, grouts and sealants.

B. Related Work:

1. Sealant other than specified herein: Section 07 90 00.

2. Cement Backerboard: Section 09 25 50.

1.03 SUBMITTALS

A. Procedure: In accordance with Section 01300.

B. Samples: 24 in. square samples of each type and color of tile glued to hardboard backing; grout joints. Samples of each type, color and shape of trim and base.

C. Data: Manufacturer's data for, pre-mixed mortars and grouts, with certification that they meet ANSI standards specified when applicable.

D. Closeout: One full box of each type, color and size of tile properly packaged and identified, by room or area, for future repair.

1.04 QUALITY ASSURANCE

A. Uniformity:

1. Obtain each color, grade, finish, type, composition, and variety of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
2. Obtain materials of a uniform quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.

B. Installer's Qualifications: Experienced firm who has successfully completed tile installations similar in material, design, and extent to that indicated for Project for at least 5 years.

C. Sample Panels: Before starting tile installation erect sample panels for each form of construction and finish required. Build sample panels complying with the following, using materials indicated for final work.

1. Make sample panels a minimum of 6 ft. square. Locate on site where directed by the Architect.

2. Make modifications requested by the Architect, or remove unsatisfactory sample panels and construct new ones.

3. Obtain Architect's acceptance of sample panels before starting final installation.

4. Retain and maintain sample panels during construction in undisturbed condition as a standard for judging completed tile work.

5. When accepted by the Architect, accepted sample panels in undisturbed condition at time of Substantial Completion may become part of the Work.

D. Master Grade Certificate: Submit a Master Grade Certificate bearing the Certification Mark of the Tile Council of America, Inc., signed by the tile manufacturer, stating the type and quality of each type of tile delivered to the job site.

E. Reference Standards: The applicable provisions of the following govern the work of this Section, except as otherwise specified.

1. TCA, Handbook for Ceramic Tile Installation.

2. ANSI A 108.1, Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile installed with Portland Cement Mortar.

3. ANSI A108.4, Latex-Portland Cement Mortar.

4. ANSI A108.5, Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.

5. ANSI A108.10, Installation of Grout In Tilework.

6. ANSI A118.3, Chemical Resistant, Water-Cleanable, Tile-Setting and Grouting Epoxy and Water-Cleanable Tile-Setting Epoxy Adhesive.

7. ANSI A118.6, Ceramic Tile Grouts.

8. ANSI A118.8, Modified Epoxy Emulsion Mortar/Grout.

9. ANSI A137.1, Standard Specifications for Ceramic Tile.

1.05 HANDLING

A. Procedure: In accordance with Section 01600. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

B. Delivery: Deliver tile cartons with grade seals unbroken.

1.06 JOB CONDITIONS

A. Set and grout this work when ambient temperature is at least 50 deg. F or higher. Do not install materials on surfaces (or when ambient temperature) is less than 40 deg. F.

B. Illuminate interior work areas during installation to provide the same of greater level of illumination, as required to properly perform this work, as will occur in the room or space after the building is in operation.

C. For exterior tile work, shade the work areas from direct sunlight during installation, as needed to prevent rapid evaporation caused by excessive heat or wind.

2.00 PRODUCTS

2.01 MATERIALS

A. Colors, Textures, and Patterns: Where manufacturer's standard products are scheduled or specified for tile, grout and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements.

1. Where no color is scheduled or specified, provide selections made by Architect from manufacturer's full range of standard colors, textures, and patterns for products of type indicated.

B. Factory Blending: For tile exhibiting color variations within the ranges selected during sample submittals, factory-blend tiles and package accordingly to those tiles taken from one package show the same color range as those taken from other packages, and match approved samples.

C. Coefficient of Friction: Shall be not less than 0.6 for level surfaces when tested in compliance with ASTM C 1028 (field test) or ASTM D 2047 (laboratory test).

D. Tile:

1. Shower and Restrooms (Locker Room Areas) Floor Tile:

a. Porcelain Ceramic Floor Tile: 2" x 2" size. Color to be selected by Architect from Dal Tile KEYSTONES Group 1 Matte Finish.

2. Shower and Locker Room Wall Tile:

a. Field Tile: 4-1/4" x 4-1/4" x 5/16" thick, with cushioned edges, semi-glass glazed. Color to be selected by Architect from Dal Tile CLASSIC colors in price group 1.

b. Accent Tile: Three (3) colors. Color to be selected by Architect from Dal Tile CLASSIC colors in price group 3.

3. Restrooms (Lobby Area) and Single Occupant Toilets Floor Tile:

a. Porcelain Ceramic Floor Tile: 2” x 2” size. Color to be selected by Architect from Dal Tile KEYSTONES Group 1 Matte Finish.

4. Restroom Wall Tile: Main Lobby Restrooms, Staff and Nurse Toilets

a. Field Tile: 11-5/8” x 23-3/8” x 5/16” thick. Color to be selected by Architect from Dal Tile PORTFOLIO Matte Finish.

b. Accent Tile: Two (2) colors. 11-5/8” x 23-3/8” x 5/16” thick. Color to be selected by Architect from Dal Tile PORTFOLIO and PORTFOLIO VIVID Matte Finish.

E. Trim: Provide matching base, caps, stops, returns, trimmers required to complete the installation.

F. Setting Materials:

1. Latex Dry-Set Mortar: Pre-sanded, latex-modified complying with ANSI A1418.4, specifically formulated for the substrates to which tile is applied.

2. Portland Cement: ASTM C 150, Type 1.

3. Sand: ASTM C 144.

4. Water: Potable, fresh.

5. Setting Bed Reinforcing Mesh: 2 in. x 2 in. x 16/16, 3 in. x 3 in. x 13/13 or 1-1/2 in. x 2 in. x 16/13 wire complying with ASTM A 82 or A 185.

G. Grout: Color(s) selected by the Architect.

1. ANSI A 118.6, latex Portland cement grout, as applicable to the joint width and recommended by the grout manufacturer.

a. Unsanded Portland Cement Grout: Keracolor Wall mixed with Plastijoints by Mapei or Laticrete Dry-Set Grout mixed with Laticrete 1776 by Laticrete International.

b. Sanded Portland Cement Grout: Keracolor Floor mixed with Plastijoints by Mapei or Laticrete Floor Grout mixed with Laticrete 1776 by Laticrete International.

H. Sealant and Back-Up for Control Joints in Tiles: As specified in Section 07 90 00.

I. Cleavage Membrane: 10-mil thick polyethylene complying with ASTM D 2103, Type 13300, or 15 lbs. asphalt-saturated felt complying with ASTM D 226.

3.00 EXECUTION

3.01 INSPECTION / PREPARATION

A. Verify conditions and measurements affecting the work of this Section at site.

B. Remove glaze and contaminants, including remaining curing compounds, from floors by wire-brushing or sandblasting.

C. Make sure that surfaces to be tiled are firm, dry, clean, and free from oil or waxy films and curing compounds, and within the following tolerances:

1. Dry-Set Tiles: 1/8 in. in 10 ft. for floors and 1/8 in. in 8 ft. for walls.

2. Mortar Set Tiles: 1/4 in. in 10 ft. for floors and 1/4 in. in 8 ft. for walls.

3. Walls shall have been engineered and installed for a maximum deflection of L/360 under loads prescribed by Code.

D. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical work, and similar items located in or behind tile has been completed before installing tile.

E. Make sure that other detrimental conditions are corrected before proceeding with installation.

3.02 INSTALLATION

A. General: Install proprietary materials in compliance with their manufacturer's printed instructions. Press or beat the tiles to obtain 100% coverage of mortar on back of tile; back butter tile if necessary.

1. Maintain minimum temperature limits and installation practices recommended by mortar and grout materials manufacturers in areas where this work is performed.

2. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignment. Saw-cut and drill tiles to obtain tight fitting, clean, sharp, undamaged cut edges.

a. Rub cuts smooth with fine abrasive stone.

b. Cut and drill so that electrical outlet, plumbing fixtures, pipes, fixtures and fittings standard plates, escutcheon and collars will overlap the tile.

3. Install tile in patterns indicated with uniform joints and perimeter units not less than one-half unit wide.

4. Where tiles selected by the Architect are installed in the same plane, but are of a different thickness, it is the Contractor responsibility to adjust the setting bed or mortar thickness so that all tiles are flush.

5. Maximum deviation from true lines and levels shall not exceed 1/8 in. in 10 ft. for floors, and 1/8 in. in 8 ft. for walls.

6. Calk penetrations in tile with sealant and backing rod specified in Section 07900. Provide expansion joints where indicated or as recommended by CTA Method EJ171.

B. Tile Blending:

1. For tile exhibiting color variations within the ranges selected during sample submittals, verify that tiles have been factory-blended and packaged accordingly

so that tiles taken from one package show the same color range as those taken from other packages, and match approved samples.

2. If not factory-blended, either return to manufacturer or blend tiles at Project site before installing.

C. Interior Tile Installations:

1. Wall Tile: Install over cement backer board in compliance with ANSI A108.5 and TCA installation method W244.

2. Floor Tile: Install over mortar bed in compliance with ANSI A108.5 and TCA installation method F114.

3.03 GROUTING / CLEANING / CURING

A. Grouting: Comply with ANSI A108.10. Finish joints of square edge tiles flush with tile surfaces; finish joints of cushion edge tiles to depth of cushion. Grout shall be free of voids and pits.

B. Fill joints grouted with epoxy flush with tile edges. The epoxy cures to a slight depression.

C. Cleaning:

1. Clean tile and repair faulty grouting. Sponge and clean surfaces with clean water and soft brushes.

2. Polish glazed tile after cleaning with clean, dry cloths.

3.04 PROTECTION

A. Protect completed installations until acceptance by the District. Protect floor tiles with reinforced kraft paper or other heavy covering securely taped in place during the construction period to prevent damage and stains. Remove protection when no longer needed.

B. When recommended by tile manufacturer, apply a coat of neutral protective cleaner to completed tilework.

C. Prohibit food and wheel traffic from tiled floors for at least 7 days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

E. Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tiles. Replace tiles damaged before acceptance at no additional cost to the District.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Principal Work in this Section:

1. Metal Suspension System and Accessories.

2. Acoustical Units.

3. Supplementary parts and components, such as inserts, clips, bracing and other miscellaneous supports required for a complete installation.

B. Related Work:

1. Mechanical and Electrical Work in Acoustical Ceilings: Divisions 15 and 16.

1.03 SUBMITTALS

A. Procedure: In compliance with Section 01300.

B. Manufacturer's Data:

1. Manufacturer's product specifications and installation instructions for ceiling materials, and suspension system and adhesive.

2. Include satisfactory test data certifying that the acoustical units comply with Code requirements.

C. Samples: Full size samples of acoustical units showing the full range of color and texture to be expected in the completed work.

D. Shop Drawings:

1. Shop drawings showing ceiling layouts, seismic bracing, method of suspension where interference such as ducts and pipes exists, with light fixtures, grilles, sprinkler heads, speakers and access panels accurately located and typical details of constructions and installation.

2. Where pipes, ducts and conduits prevent direct suspension, and trapezes have to be used, justify the suspension system with structural calculations.

3. Reproduction of the Contract Drawings as shop drawings is not acceptable; take necessary measurements at the job site.

E. Closeout:

1. Manufacturer's recommendations for cleaning and refinishing ceiling materials, including precautions against materials and methods which may be detrimental to finishes and acoustical performances.

2. Full box of acoustical units matching those installed, packaged with protective covering for storage, and identified with appropriate labels.

1.04 QUALITY ASSURANCE

A. Provide evidence that acoustical units, and adhesive when applicable, comply with Code for flammability, combustibility and toxicity.

1.05 HANDLING

A. Procedure: In compliance with Section 01655.

B. Storage: Store acoustical panel cartons open at each end to stabilize moisture content and temperature, in fully enclosed space(s), in well-ventilated area protected from weather, moisture, soiling, extreme temperatures and humidity.

1.06 JOB CONDITIONS

A. Do not install acoustical ceilings until the space to receive them has enclosed, and is weathertight, until work above ceilings has been completed, and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

B. Illuminate work areas during installation to provide the same or greater level of illumination, as required to properly perform the work, as will occur in the room or space after the building is in operation.

2.00 PRODUCTS

2.01 MATERIALS

A. Acoustical Units in Classrooms: 24 in. x 48 in. x 1-3/4 in. thick, white, LYRA Plant Based (PB) with Tegular edge by Armstrong Interiors, Inc. Fire Performance High CAC 44, fire resistance Class A (UL). Flame Spread: 25. Smoke Development: 50.

B. Acoustical Units Other Locations (per plan): 24 in. x 24 in. x 1-3/4 in. thick, white, LYRA Plant Based (PB) with Tegular edge by Armstrong Interiors, Inc. Fire Performance High CAC 42, fire resistance Class A (UL). Flame Spread: 25. Smoke Development: 50.

C. Suspension System:

1. Grillage:

a. Silhouette XL 1/8” Reveal Armstrong World Industries.

b. The system shall have a “Heavy Duty” classification complying with ASTM C 635.

2. Hanger Wires: Galvanized carbon steel, ASTM A 641 soft-temper class 1 coating, prestretched, yield-stress load of at least 3 times design load, not less than 12 gage. 12 gage shall be 0.106 inches in diameter.

3. Accessories: Devices for attachment to overhead construction, secondary members, splines, splicers, connection slips, wall connectors and all other accessories required for a complete installation.

4. Trim:

a. As required by construction, and compatible with design and appearance of ceiling.

b. Perimeter trim and trim in ceiling penetrations shall permit lateral adjustment of at least 1/2 in. to accommodate irregularities in vertical surfaces interrupting ceiling. Flame spread less than 25 and smoke development less than 450.

5. Finish:

a. Concealed Ferrous Metal Surfaces: Galvanized, cadmium-plated or coated with a factory-applied rust-inhibitive paint.

b. Exposed Metal Surfaces: Prime and apply a satin baked-on enamel finish matching the color of the acoustical units, as approved by the Architect (white and black).

C. Adhesive for Cemented Units: ASTM D 1779.

3.00 EXECUTION

3.01 INSPECTION

A. Verify conditions and measurements affecting the work of this Section at site. Make sure that detrimental conditions are corrected before proceeding with installation.

3.02 INSTALLATION

A. General:

1. Install materials in compliance with the Drawings, these Specifications and their manufacturer's printed instructions; in case of conflict, the most stringent provision shall apply.

2. Comply with ASTM C 636 and E 580, governing regulations and industry standards applicable to this work.

3. Plan layout to balance border widths at opposite edges of each ceiling area.

4. Avoid use of less than half-width acoustical units wherever possible.

5. Comply with reflected ceiling plans shown on the Contract Drawings.

6. Do not exceed 1/8 in. in 12 ft. maximum deviation from level and flat of the completed ceilings when measured with a straightedge placed at any location on the ceiling; ¼ in. total deviation within any single area.

B. Suspended Grillage Installation:

1. 12 gage (minimum) hanger wires may be used for up to and including 4 ft. by 4 ft. grid spacing along main runners.

2. Provide 12 gage hanger wires at the ends of all main and cross runners within 8 in. from the support or within ¼ of the length of the end Tee, whichever is least, for the perimeter of the ceiling area. End connection for runners which are designed and detailed to resist the applied horizontal forces may be used in lieu of the 12 gage hanger wires subject to DSA review and approval.

3. Provide trapeze/other supplementary support members at obstructions to main hanger spacing. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits or discontinuous areas. Hanger wires that are more than 1 in. 6 out of plumb shall have counter-sloping wires.

4. Ceiling grid members may be attached to not more than 2 adjacent walls per AGCE 7-05 Section 13.5.6.2b. Ceiling grid members shall be at least ¾ in. free of other walls. If walls run diagonally to ceiling grid system runners, one end of main and cross runner should be free and a minimum of ¾ in. clear of wall.

5. At the perimeter of the ceiling area where main or cross runners are not connected to the adjacent wall, provide interconnection between the runners at the free end to prevent lateral spreading. A metal strut or a 16 gage wire with a positive mechanical connection to the runners may be used where the perpendicular distance from the wall interlock is not required.

6. Provide sets of four 12 gage splayed bracing wires oriented 90 deg. from each other at the following ceilings:

   a. Place sets of bracing wires at a spacing not more than 12 ft. by 12 ft. o.c.

   b. Provide bracing wires at locations not more than ½ the spacing given above from each perimeter wall and at the edge of vertical ceiling offsets.

   c. The slope of these wires shall not exceed 45 deg. from the plane of the ceiling and shall be taut without causing the ceiling to lift. Splices in bracing wires are not permitted without special DSA approval.

7. Fasten hanger wires with not less than 3 tight turns. Fasten bracing wires with 4 tight turns. Make tight turns within a distance of 1-1/2 in. Hanger or bracing wires anchors to the structure shall be installed in such a manner that the direction of the wire aligns as closely as possible with the direction of the forces acting on the wire.

   Note: Wire turns made by machine where both strands have been deformed or bent in wrapping are acceptable substitute for the 1-1/2 in. requirement, but the number of turns shall be maintained and be as tight as possible.

8. Separate all ceiling hanging and bracing wires at least 6 in. from all unbraced ducts, pipes, conduit, etc. Lightweight items, such as single electrical conduit, not exceeding ¾ in. nominal diameter, may be attached to hanger wires using connectors acceptable to DSA.

9. Attach light fixtures to the ceiling grid runners to resist a horizontal force equal to the weight of the fixtures.

10. Flush or recessed light fixtures and air terminals or services weighing less than 56 lbs. may be supported directly on the runners of a heavy duty grid system, but, in addition, they must have a minimum of two 12 gage slack safety wires

attached to the fixture at diagonal corners and anchored to the structure above. All 4 ft. x 4 ft. light fixtures must have slack safety wires at each corner.

a. Flush and recessed light fixtures and air terminals or services weighing 56 lbs. or more must be independently supported by not less than 4 taut 12 gage wires each attached to the fixture and to the structure above regardless of the type of ceiling grid system used.

b. The 4 taut 12 gage wires including their attachment to the structure above must be capable of supporting 4 times the weight of the unit.

11. Support surface-mounted light fixtures by at least 2 positive devices which surround the ceiling runners and which are each supported from the structure above by a 12 gage wire. Spring clips/clamps that connect only to the runners are not acceptable.

a. Provide additional supports when light fixtures are 8 ft. or longer.

12. Classification of ceiling grid shall be Heavy Duty.

a. Main Runner: Manufacturer's catalog No. 1870 by Chicago Metallic Corp.

b. Cross Runner: Manufacturer's catalog No. 1874 by Chicago Metallic Corp.

c. Detail for Runner Splice: Manufacturer's catalog No. by Chicago Metallic Corp.

13. For fire-rated ceilings provide UL design number, or state FM listing number. The components and installation details must conform in every particular with the UL or FM approval for the design number specified. Custom design which combine components from different approved design but have not been tested as a complete assembly will not be acceptable.

14. Pop rivets, screws, or other attachments are not acceptable unless specifically detailed on the Drawings and approved by UL and FM.

15. Install perimeter and edge trim level with flush, hairline joints.

a. Screw attach moldings to supports at not over 16 in. o.c. and not more than 3 in. from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 ft. Miter corners accurately and connect securely.

16. At locations where the portable partitions specified in Section 10615 are to be installed, the suspension system shall be resistant to upward spring pressure of 5 lbs./ft. of panel.

C. Acoustical Units: Match tile for color and pattern by using tile from cartons in the same sequence as manufactured.

1. Scribe and cut acoustical units for accurate fit at borders and around work which penetrates ceilings. Install with flush, tight joints.

2. For reveal-edged units on suspension system runners, install units with bottom of reveal in firm contact with top surface of runner flanges.

D. Where acoustical units are indicated to be cemented to gypsum board ceilings, verify that substrate is free of materials that would affect bond capabilities of the adhesive.

1. Daub acoustical units on back side with 4 equal daubs of adhesive near corner of tile so that contact area of daub when in final position is approximately 2 in. in diameter.

2. Press units in place, align joints by using fiber splines and abut units with tight, flush joints.

3.03 CLEANING

A. Clean soiled acoustical units and their suspension systems in compliance with their manufacturer's printed instructions. Remove and replace units that are damaged or cannot be cleaned, to the Architect's satisfaction at no additional cost to the District.

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END OF SECTION

SECTION 09 64 66
WOOD ATHLETIC FLOORING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Related work specified under other sections.

1. Concrete and Concrete Finishing – Section 03

a. Concrete Slab Depression: Existing slab depression – Approximately 6.25”

b. Surface Finish: steel troweled and finished smooth.

c. Concrete Tolerance: 1/8” in radius of 10’.

d. Compressive Strength: Concrete shall be a minimum of 3,000 psi (21 MPa) and a maximum of 4000 psi (28MPa) compressive strength after 28 days. Concrete shall be free of washed river gravel, pea gravel, flint or hardener additives. No lightweight concrete.

e. Floor Flatness and Floor Levelness (FF and FL) numbers are not recognized.

2. Waterproofing – Section 07 11 20.

a. Concrete subfloors on or below grade shall be adequately waterproofed beneath the slab and at the perimeter walls and on the earth side of below grade walls by general contractor using suitable type membrane.

3. Finish Hardware – Section 08 71 00.

4. Athletic Equipment – Section 11 66 00.

1.2 REFERENCES

A. MFMA- Maple Flooring Manufacturers Association

B. FSC- Forest Stewardship Council

1.3 QUALITY ASSURANCE

A. Floor System Manufacturer Qualifications

1. Basis of design shall be Bio-Channel Classic floor system as provided by Robbins Sports Surfaces, www.robbinsfloor.com, (800-543-1913)

2. Substitutions to be pre-approved 10 days prior to bid day.

3. Manufacturer shall be an established firm experienced in field and have been in business or a minimum of ten (10) years; Robbins, Inc. or an approved equal.

4. Manufacturer will be a member in good standing of the Maple Flooring Manufacturers Association (MFMA).

B. Floor Contractor/Installer Qualifications and Certifications

1. Flooring contractor shall be a firm experienced in flooring field and approved by manufacturer.

2. Submit a list of at least three completed projects of similar magnitude and complexity.

C. Surface Appearance (Available option)

1. Expansion spaces will not exceed 1/64” (0.4mm) at time of installation and will be spread evenly across the floor with each row of flooring.

2. Expansion spacing will be installed to allow for normal expected increases in Equilibrium Wood Moisture Content (EMC).

1.4 SUBMITTALS

A. Specification and Drawings

1. Submit Robbins Bio-Channel Classic specification sheet

2. Submit Robbins Bio-Channel Classic drawings as required.

B. Concrete Guidelines

1. Submit MFMA Recommendations for correct preparation, finishing and testing of concrete subfloor surfaces to receive wood flooring.

C. Sample

1. Submit one (1) sample of BioChannel Classic, if requested by architect. Sample to be made by the manufacturer and so indicated.

D. Maintenance Guidelines

1. Submit copy of Maintenance Instructions.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery of Materials

1. Materials shall not be delivered, stored or installed until all masonry, painting, plastering tilework, marble and terrazzo work is complete, and all overhead mechanical work, lighting, backstops, scoreboards are installed. Room temperature of 55-80 degrees Fahrenheit (13 to 27 degrees Celsius) and relative humidity of 35-50 % are to be maintained. Ideal installation/storage conditions are the same as those that will prevail when building is occupied.

2. Materials shall not be stored at the installation location if the moisture content of the concrete slab exceeds 4% or vapor transmission exceeding 4.5 pounds per 1,000 square feet (2.20 kg per 100 square meters).

1.6 JOB CONDITIONS-SEQUENCY

A. Do not install floor system until concrete has been cured 60 days and the requirements in paragraph 1.04 A are obtained.

B. General Contractor is responsible to ensure slab is clean and free of all dirt and debris prior to floor installation beginning.

C. Permanent heat, light and ventilation shall be installed and operating during and after installation. Maintain a temperature range of 55 to 80 degrees Fahrenheit (13 to 27 degrees Celsius) and a relative humidity range of 35 to 50%. Consult MFMA guidelines for further information.

D. After floors are finished, area to be kept locked by general contractor to allow curing time for the finish. If after required curing time general contractor or owner requires use of gym, he shall protect the floor by covering with non-fibered kraft paper or red rosin paper with taped joints, until acceptance by owner (or owner's agent) of complete gymnasium floor.

1.7 WARRANTY

A. Guarantee shall not cover damage caused in whole or in part by casualty, ordinary wear and tear, abuse, use for which material is not designed, faulty construction of the building, settlement of the building walls, failure of the other contractors to adhere to specifications, separation of the concrete slab and excessive dryness or excessive moisture from humidity, spillage, migration through the slab or wall, or any other source.

B. Robbins, Inc. hereby warrants the Bio-Channel Classic material to be free from manufacturing defects for a period of 1 year. This warranty is in lieu of all other warranties, expressed or implied including but not limited to any warranty of merchantability or fitness for a particular purpose, and of any other obligations on the part of Robbins. In the event of breach of any warranty, the liability of Robbins shall be limited to repairing or replacing Bio-Channel Classic material and system components supplied by Robbins and proven to be defective in manufacture, and shall not include any other damages, either direct or consequential.

PART 2 – PRODUCTS

2.1 MATERIAL

A. Vapor Barrier

1. 6-mil polyethylene Moisture Suppression System for projects with high concrete moisture.

B. Subfloor

1. Robbins Bio-Channels: engineered-wooden sleeper with 7/16" EPDM Bio-Pads attached, factory encased in a steel channel. Sleeper must be free to move vertically within steel channel confines to assure proper uniformity of resiliency and function. Ground rubber or neoprene pads not acceptable.

2. 23/32" structural rated sheathing, exposure 1 (CD-X). 1/2" plywood or OSB not acceptable.

C. Maple Flooring

1. 25/32" thick x 2-¼" width, 2nd&Better grade, Unfinished TGEM, KD Northern Hard Maple, Continuous Strip® XL Flooring as manufactured by Robbins and graded in accordance with MFMA-FJ rules. Standard Random Length Maple not acceptable.

D. Fasteners

1. Flooring – 1-¾" barbed cleats or staples.

2. Subfloor – 1-5/8" to 1-¾" subflooring nails or staples.

3. Channel anchors - 1-¼" long steel, powder actuated, pneumatic anchors, Powers SPIKE® anchors, or Tapcons.

E. Finish Materials

1. Bona Kemi Finish

F. Gamelines

1. Gameline paint(s) shall be recommended by the finishing materials manufacturer, and must be compatible with the finish.

G. Perimeter Base

1. Robbins 3” x 4” ventilating type. (Specify black or brown)

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect concrete slab for proper tolerance and dryness, and report any discrepancies to the general contractor and architect in writing. Slab will be level to within 1/8” in a 10’. Moisture content of the concrete slab shall not exceed 4% or vapor transmission exceeding 4.5 pounds per 1,000 square feet (2.20 kg per 100 square meters).

B. All work required to put the concrete subfloors in acceptable condition shall be the responsibility of the general contractor.

C. Subfloor shall be broom cleaned by general contractor.

D. Installer shall document all working conditions provided in General Specifications prior to commencement of installation.

3.2 INSTALLATION

A. Vapor Barrier

1. Install polyethylene with joints lapped a minimum of 6” and turned up 4” at the walls.

B. Subfloor

1. Place Bio-Channels 16-1/16” ON CENTER end-to-end staggering end joints in adjacent rows, perpendicular to the intended direction of the maple flooring. Gap the ends of the sleepers approximately ¼”. Provide 1-½” to 2" expansion void at the perimeter and all vertical obstructions.

2. Anchor Bio-Channels at predetermined locations.

   NOTE: See attached shop drawing for deep slab depression detail. Anchor sleepers in 3 of the pre-determined holes, at both ends and in center. When shimming for leveling is necessary, anchor in all 5 holes.

   NOTE: If extensive shimming is necessary, alternate anchoring ‘non-standard’ method may be necessary. Additional costs for this ‘non-standard’ method are to be borne by the purchaser.

3. Install solid blocking at doorways, under bleachers in the stacked position, and below portable goals.

4. Install Bleacher Blocking per manufacturer’s recommendations.

5. Install 23/32” (3/4”) plywood subfloor parallel to sleeper channels and securely fasten subfloor 6” ON CENTER along each channel sleeper.

C. Maple Flooring

1. Machine nail maple finish flooring 10” to 12” O.C. with end joints properly driven up and proper spacing provided for humidity conditions in specific regions. Consult your local Robbins “Certified” contractor. Provide 2” expansion voids at the perimeter and at all vertical obstructions. OPTION: (Specify or Delete) Expansion rows will be evenly distributed with each row of flooring, with each space not exceeding 1/64”.

3.3 FINISHING

A. Sanding

1. Sand per manufacturer’s recommendations.

2. After sanding, buff entire floor using 100 grit screen or equal grit sandpaper, with a heavy-duty buffing machine.

3. Inspect entire area of floor to insure the floor presents a smooth surface without drum stop marks, gouges, streaks or shiners.

4. Vacuum and/or tack floor before first coat of seal.

5. Floor should be clean and completely free of dirt and sanding dust.

B. Finishing

1. Gymnasiums

a. Apply (2) seal coats of Bona “DTS and (3) finish coats Bona “Sportive Finish”

b. Buff and vacuum and/or tack between each coat after it dries.

c. Apply game lines accurately after the buffing and vacuuming the coated surfaces. Game lines shall be painted between seal coats and finish coats. Layout in accordance with drawings. For game lines, use current rules of association having jurisdiction. Lines shall be straight with sharp edges in colors selected by architect.

3.4 WALL BASE INSTALLATION

1. Install Robbins vent cove base anchored to walls with base cement or screws and anchors. Use pre-molded outside corners and neatly mitered inside corner.

3.5 CLEANING

1. Clean up all unused materials and debris and remove it from the premises.

3.6 DEMO

1. Remove and dispose existing floor system down to bare concrete and dispose of properly.

END OF SECTION

SECTION 09 64 67
WOOD FLOORING – MUSIC CLASSROOM

PART 1 – GENERAL

1.1 DESCRIPTION

A. Related work specified under other sections. (A cross-reference should be incorporated in these sections.)

1. Concrete and Concrete Finishing - Section 03 30 00

a. Concrete Slab Depression: 2 1/8” using 25/32 flooring and subfloor.

b. Surface Finish: steel troweled and finished smooth.

c. Concrete Tolerance: +/- 1/8” in radius of 10’.

d. Floor Flatness and Floor Levelness (FF and FL) numbers are not recognized.

e. High spots shall be ground level and low spots shall be filled in with approved leveling compound by the general contractor to meet the tolerance above.

2. Membrane Waterproofing and Dampproofing - Section 07.

a. Concrete subfloors on or below grade shall be adequately waterproofed beneath the slab and at the perimeter walls and on the earth side of below grade walls by general contractor using suitable type membrane.

3. Thresholds - Section 08.

4. Game Standard Inserts - Section 11.

1.2 REFERENCES

A. MFMA - Maple Flooring Manufacturers Association

B. MFMA PUR – Performance Uniformity Requirements

C. DIN 108032 (part 2) 2001 - Performance Test

D. DIN 108032 (part 2) 1991 - Performance Test

E. ASTM F2772 - Athletic Performance Properties of Indoor Sports Floor Systems

F. EN 14904 – European Committee for Standardization – Surfaces for Sports areas

G. ASTM F2772 - Athletic Performance Properties of Indoor Sports Floor Systems

H. FIBA – International Basketball Federation

I. FSC – Forest Stewardship Council

1.3 QUALITY ASSURANCE

A. Floor System Manufacturer Qualifications

1. Basis of design shall be Eclipse floor system as provided by Robbins Sports Surfaces, www.robbinsfloor.com, (800-543-1913).

2. Substitutions must be pre-approved 10 days prior to bid day. Substitution product must meet or exceed all of the floor system performance standards in section D. with third party documentations.

3. Manufacturer shall be an established firm experienced in field and have been in business for a minimum of ten (10) years; Robbins, Inc. or an approved equal.

4. Manufacturer will be a member in good standing of the Maple Flooring Manufacturers Association (MFMA).

B. Floor Contractor/Installer Qualifications and Certifications

1. The flooring contractor shall be a Robbins Accredited Installer with MFMA Accredited Installer(s) on-site for the duration of the wood floor installation; or, a contractor approved by Robbins Sports Surfaces.

2. Flooring contractor shall submit a list of at least three completed projects of similar magnitude and complexity completed under current corporate identity.

C. Floor System Design

1. The resilient padding provides consistent gradient resiliency. Assures uniform compression deflection transition from light loading to aggressive loading.

D. Floor System Performance

1. Eclipse meets or exceeds criteria of the following performance criteria:

a. MFMA PUR

b. DIN 18032 Part2 2001

c. DIN 18032 Part2 1991

d. ASTM F2772 Sport Floor Standards

e. FIBA International Standards

f. EN 14904 Standards

2. Independent testing report showing the system passing all criteria shall be provided as part of the bid qualification process and submittal process.

1.4 SUBMITTALS

A. Specification and Drawings

1. Submit Robbins Eclipse specification sheet.

2. Submit Robbins Eclipse drawings as required.

B. Sample

1. Submit one (1) sample of Eclipse, if requested by architect

C. Concrete Guidelines

1. Submit MFMA Recommendations for correct preparation, finishing and testing of concrete subfloor surfaces to receive wood flooring.

D. Maintenance Guidelines

1. Submit copy of Maintenance Instructions.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery of Materials

1. Materials shall not be delivered, stored or installed until all masonry, painting, plastering tilework, marble and terrazzo work is complete, and all overhead mechanical work, lighting, backstops, scoreboards are installed. Room temperature of 55-80 degrees Fahrenheit and relative humidity of 35-50 % are to be maintained. Ideal installation/storage conditions are the same as those that will prevail when building is occupied

2. Materials shall not be stored at the installation location if the moisture content of the concrete slab exceeds 4% or vapor transmission exceeds 4.5 pounds per 1,000 square feet (2.20 kg per 100 square meters) using a calcium chloride test or the In-Slab relative humidity level for the concrete slab is 80% or lower before installation.

1.6 JOB CONDITIONS-SEQUENCY

A. Do not install floor system until concrete has been cured 60 days and the requirements in paragraph 1.05 A are obtained.

B. General Contractor is responsible to ensure slab is clean and free of all dirt and debris prior to floor installation beginning.

C. Permanent heat, light and ventilation shall be installed and operating during and after installation. Maintain a temperature range of 55 to 80 degrees Fahrenheit and a relative humidity range of 35 to 50%. Consult MFMA guidelines for further information.

D. After floors are finished, area to be kept locked by general contractor to allow curing time for the finish. If after required curing time general contractor or owner requires use of gym, he shall protect the floor by covering with non-fibered kraft paper or red rosin paper with taped joints, until acceptance by owner (or owner's agent) of complete gymnasium floor.

1.7 WARRANTY

A. Guarantee shall not cover damage caused in whole or in part by casualty, ordinary wear and tear, abuse, use for which material is not designed, faulty construction of the building, settlement of the building walls, failure of the other contractors to adhere to

specifications, separation of the concrete slab and excessive dryness or excessive moisture from humidity, spillage, migration through the slab or wall, or any other source.

B. Robbins, Inc. hereby warrants the Eclipse material to be free from manufacturing defects for a period of 1 year. This warranty is in lieu of all other warranties, expressed or implied including but not limited to any warranty of merchantability or fitness for a particular purpose, and of any other obligations on the part of Robbins. In the event of breach of any warranty, the liability of Robbins shall be limited to repairing or replacing Eclipse material and system components supplied by Robbins and proven to be defective in manufacture, and shall not include any other damages, either direct or consequential.

PART 2 – PRODUCTS

2.1 MATERIAL

A. Vapor Barrier

1. 6-mil polyethylene.

B. Subfloor

1. Robbins Eclipse subfloor panels with factory attached resilient pads.

C. Maple Flooring Manufacturers Association (MFMA) Wood Flooring. Flooring shall be MFMA-FJ grade marked as manufactured by Robbins.

1. Specie: Northern Hard Maple Continuous Strip XL Flooring as manufactured by Robbins and graded in accordance with MFMA-FJ rules. Standard Random Length Maple not acceptable.

2. Seasoning: Kiln Dried

3. Matching: Tongue and groove on side-match and end-match.

4. Thickness: 25/32”

5. Width: 2 ¼”

6. Grade: 2nd and Better

7. Certified Wood:
   a. Options (delete or modify above):
      1) FSC

D. Fasteners

1. Flooring - 2” barbed cleats or staples.

2. Subfloor - 1” coated staple of equivalent.

E. Finishing materials

1. Bona “DTS” sealer

2. Bona Finish

F. Gamelines

1. Gameline paint(s) shall be recommended by the finishing materials manufacturer, and must be compatible with the finish.

G. Perimeter

1. 3” x 4” ventilating type. (Specify black or brown)

PART 3 – EXECUTION

3.1 Inspection

A. Inspect concrete slab for proper tolerance and dryness, and report any discrepancies to the general contractor and architect in writing. Slab will be level to within 1/8” (3mm) in a 10’. Moisture content of the concrete slab shall not exceed 80% in accordance to an In-Slab Relative Humidity test or shall not exceed 4% or 4.5 pounds per 1,000 square feet (2.20 kg per 100 square meters) vapor transmission

B. All work required to put the concrete subfloors in acceptable condition shall be the responsibility of the general contractor.

C. Subfloor shall be broom cleaned by general contractor.

D. Installer shall document all working conditions provided in General Specifications prior to commencement of installation.

3.2 INSTALLATION

A. Vapor Barrier
1. Install polyethylene with joints lapped a minimum of 6” and turned up 4” at the walls.

B. SUBFLOOR

1. Position Eclipse subfloor panels per manufacturer’s instructions, integrating top layer with adjacent panels. Allow for a ¼” gap at subfloor panel end joints. Provide 1-½” to 2" expansion void at the perimeter and all vertical obstructions.

2. Install solid blocking at doorways, under bleachers in the stacked position, and below portable goals.

3. Install Bleacher Blocking per manufacturer’s recommendations.

4. Properly anchor subfloor panels at each factory designated location.

C. FLOORING

1. Machine nail maple flooring along each edge of the Eclipse panel’s upper layer, driving up all end joints and proper spacing provided for humidity conditions in specific regions. Consult your local Robbins “Certified” contractor. Provide 2” (50mm) expansion voids at the perimeter and at all vertical obstructions.

3.3 FINISHING

A. Sanding

1. Sand per manufacturer's recommendations.

2. After sanding, buff entire floor using 100 grit screen or equal grit sandpaper, with a heavy-duty buffing machine.

3. Inspect entire area of floor to insure the floor presents a smooth surface without drum stop marks, gouges, streaks or shiners.

4. Vacuum and/or tack floor before first coat of seal.

5. Floor should be clean and completely free of dirt and sanding dust.

B. FINISHING

1. Gymnasiums

a. Apply (2) coats of Bona "DTS" seal and (3) coats of Bona "Sportive" Finish

b. Buff and vacuum and/or tack between each coat after it dries.

c. Apply game lines accurately after the buffing and vacuuming the coated surfaces. Game lines shall be painted between seal coats and finish coats. Layout in accordance with drawings. For game lines, use current rules of association having jurisdiction. Lines shall be straight with sharp edges in colors selected by architect.

3.4 WALL BASE INSTALLATION

A. Install vent cove base anchored to walls with base cement or screws. Use pre-molded outside corners and neatly mitered inside corner.

3.5 CLEANING

A. Clean up all unused materials and debris and remove it from the premises.

3.6 DEMOLITION

A. Remove and dispose existing floor system down to bare concrete and dispose of properly.

END OF SECTION

SECTION 09 65 13
RUBBER BASE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Topset coved rubber base for installation with surface flooring.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 03 31 00 – Cast-in-Place Concrete.

3. Section 09 65 19 – Luxury Vinyl Tile.

4. Section 09 65 20 – Vinyl Based Tile.

5. Section 09 68 13 – Carpet Tile.

1.02 SUBMITTALS

A. Procedure: In compliance with Section 01 33 00.

B. Product Data: Submit manufacturer's published technical data describing materials, construction and recommended installation instructions. Submit technical data and installation instructions for each adhesive material.

C. Green Building: For adhesives, include printed statement of VOC content and chemical components.

D. Samples: Submit Samples of top set base in each available color. Following color selections, submit Samples, not less than 12 inches long of each selected color and type. Submit pint cans of each type adhesive.

E. Maintenance Instructions: Submit manufacturer's recommendations for maintenance, care and cleaning of base.

F. Maintenance Materials: Before Substantial Completion, deliver at least 50 lineal feet and five outside corner units of each color of rubber base installed. Deliver the materials in unopened factory containers or in sealed cartons with labels identifying the contents, matching installed materials. Include unopened cans of adhesives adequate to install the maintenance materials.

1.03 QUALITY ASSURANCE

A. Qualifications of Installer: Minimum five (5) years experience in successfully installing the same or similar flooring materials.

B. Comply with the following as a minimum requirement:

1. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.

2. ASTM F1861: Standard Specification for Resilient Wall Base.

3. Comply with current Collaborative for High Performance Schools (CHPS) requirements, or California Green Building (CALGreen) Codes, whichever is more stringent.

4. Chemically based products such as sealers, primers, fillers, adhesives, etc. must be approved by Owner's Office of Environmental Health and Safety (OEHS).

5. Each selected color and configuration shall be from same dye lot and color.

1.04 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the Project site in original unopened manufacturer's packaging clearly labeled with manufacturer's name. Store materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer's printed instructions, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C), for a minimum of 48 hours before installation.

1.05 PROJECT CONDITIONS

A. Install products after other finishing operations, including painting, have been completed.

B. Ventilation and Temperature: Verify areas that are to receive rubber base are ventilated to remove fumes from installation materials, and areas are within temperature range recommended by the various material manufactures for site installation conditions, between 48 hours before and after installation.

C. Maintain the ambient relative humidity between 40% and 60% during installation.

D. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

1.06 WARRANTY

A. Manufacturer shall provide a five-year material warranty.

B. Installer shall provide a two-year fabrication and installation warranty.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Tarkett (Johnsonite).

E. Or Equal.

2.02 MATERIALS

A. Rubber base:

a. Basis-of-Design Product: Subject to compliance with requirements, provide Tarkett Traditional Thermoplastic Vinyl Wall Base, 4” high x 1/8” thick, cove type, with matching molded inside/outside corners as required. Colors to be determined by architect.

b. Performance requirements shall meet ASTM F1861 Standard Specification for Resilient Vinyl Wall Base, Type TV, Group 1

B. Conform to ASTM F 861; Group 2, solid (homogeneous); Type 1, TS, (thermoset) vulcanized rubber, Style A, 4-inch high unless otherwise indicated, integral colors as selected, non-shrinking, 1/8 inch thick, with matching molded outside corners.

C. Base Adhesive: Water based, low odor type, as recommended by manufacturer of rubber base.

PART 3 - EXECUTION

3.01 COORDINATION

A. Coordinate the Work of this section with other sections to provide a level, smooth and clean finish surfaces to receive rubber base.

3.02 EXAMINATION

A. Field verify dimensions and other conditions affecting the Work of this section before commencing the Work of this section.

B. Before Work is started, examine surfaces that are to receive rubber base. Deficiencies shall be corrected before starting the Work of this section.

3.03 PREPARATION

A. Do not start preparation until adjacent concrete floor slabs are at least 90 days old and finish flooring is installed.

B. Install rubber base when ambient temperature is 70 degrees F or higher, within range recommended by manufacturer, and ambient relative humidity between 40% - 60%.

C. Vacuum clean substrates to be covered by resilient products immediately before installation.

3.04 INSTALLATION

A. Install top set base at hard floors, including resilient flooring, concrete and wood, carpet and other soft floors.

B. Securely fasten cement base to backing in long lengths in accordance with manufacturer’s recommendations. Lay out lengths so that not less than 18 inches long filler pieces are provided. Assure that top and toe continuously contact the wall and floor,

and that all joints are tight. Install matching factory formed external corners at all offsets. Inside corners shall be coped; wrapped corners are not acceptable. Base and outside corners shall be rolled with a seam roller before adhesive sets. Do not stretch base during installation.

C. Use of adhesive gun is prohibited. Apply adhesive directly to substrate using the appropriate notched trowel or spreader according to manufacturer's instructions. Maintain 1/8 inch gap from top of base to prevent adhesive oozing onto adjacent surfaces.

3.05 CLEANING

A. Maintain surfaces of base clean as installation progresses. Clean rubber base when sufficiently seated and remove foreign substances.

B. Clean adjacent surfaces of adhesive or other defacement. Replace damaged and/or defective Work to the specified condition.

3.06 CLEAN UP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.07 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 09 65 19
LUXURY VINYL TILE

1.00 - GENERAL

1.01 SECTION INCLUDES

A. Luxury vinyl tile flooring as indicated.

1.02 RELATED SECTIONS

A. Division 01 - General Requirements.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 09 65 13 - Rubber Base.

1.03 DEFINITIONS

A. Pop-up: A pop-up is defined as any surface deviation or looseness of substrate that is equal to or greater than 1/64 (0.015625) inch above the concrete floor level, regardless of the size.

1.04 REFERENCES

A. Armstrong Flooring Technical Manuals.

B. Armstrong Flooring Guaranteed Installation Systems instructions.

C. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

D. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.

E. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

F. ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring.

G. ASTM F 1700 Standard Specification for Solid Vinyl Tile.

H. ASTM F 1861 Standard Specification for Resilient Wall Base.

I. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

J. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

1.05 PERFORMANCE REQUIREMENTS

A. Provide flooring which has been manufactured, fabricated, and installed to performance criteria certified by manufacturer without defects, damage, or failure.

B. Pre-installation Meeting: Conduct an on-site pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.

C. Pre-installation Testing: Conduct pre-installation testing as follows: [Specify testing (i.e., moisture tests, bond test, pH test, etc.).]

D. Test Installations/ Mock-ups: Install at the project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Owner's and Consultant's acceptance of finish color, texture and pattern, and workmanship standards.

E. Sequencing and Scheduling:

1. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.
2. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test.

1.06 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submit the manufacturer's standard samples showing the required colors for flooring and applicable accessories.

C. Shop Drawings. Submit shop drawings, seaming plan, coving details, and manufacturer's technical data, installation, and maintenance instructions (latest edition of Armstrong Flooring Guaranteed Installation Systems instructions for flooring and accessories.

D. Submit Safety Data Sheets (SDS) available for adhesives, moisture mitigation systems, primers, patching/leveling compounds, floor finishes (polishes) and cleaning agents and Material Information Sheets for flooring products.

E. If required, submit the manufacturer's certification that the flooring has been tested by an independent laboratory and complies with the required fire tests.

F. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
2. Warranty: Warranty documents specified herein.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.

B. Installer Qualifications: All products shall be installed by a single installer with a minimum of five (5) years demonstrated experience, with adequate equipment, skilled workers, and practical experience to meet the project schedule.

   1. Select an installer who is experienced and competent in the installation of Armstrong resilient solid vinyl tile flooring and the use of Armstrong Flooring subfloor preparation products.

      a. Engage installers certified as Armstrong Commercial Flooring Certified Installers.
      b. Confirm installer's certification by requesting their credentials.

C. Fire Performance Characteristics: Provide resilient tile flooring with the following fire performance characteristics as determined by testing material in accordance with ASTM test methods indicated below by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:

   1. ASTM E 648 (NFPA 253) Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I
   2. ASTM E 662 (NFPA 258) (Smoke Generation) Maximum Specific Optical Density of 450 or less
   3. CAN/ULC-S102.2 – Flame Spread Rating and Smoke Developed – Results as tested.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Comply with Division 1 Product Requirements Sections.

B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.

D. Store materials in a clean, dry, enclosed space off the ground, protected from harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer. Protect adhesives from freezing. Store flooring, adhesives, and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

1.09 PROJECT CONDITIONS

A. Coordinate delivery schedule with the Contractor and project schedule to minimize on site storage.

B. Store materials in a dry area, protected from freezing, staining, contamination or damage.

C. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65ºF (18ºC) and a maximum temperature of 85ºF (29ºC) for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature

of 55ºF (13ºC) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances. Refer to the Armstrong Flooring Guaranteed Installations Systems instructions for a complete guide on project conditions.

1.10 LIMITED WARRANTY

A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.

B. Limited Warranty Period: 20 years for Exchange™ Luxury Flooring.

C. The Limited Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

D. For the Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

1.11 EXTENDED SYSTEM LIMITED WARRANTY

A. Resilient Flooring System: Submit a written warranty executed by the manufacturer, agreeing to repair or replace system (subfloor preparation products, adhesive, and floor covering) that fails within the warranty period.

B. Limited Warranty Period: 10 years on top of the Resilient Flooring Limited Warranty.

C. [S-463 Level Strong™ cement based self-leveling compound] [S-466 Patch Strong™ flexible patching and smoothing compound] [S-464 Prime Strong™ acrylic primer for porous substrates] [S-465 NP Prime Strong™ acrylic primer for non-porous substrates] [S-462 Seal Strong™ two-part moisture mitigation system].

D. The installation of an Armstrong Flooring product along with the recommended Armstrong Flooring adhesive, as well as any one of the Strong System subfloor preparation products listed above, provides 10 additional years of limited warranty coverage. The Strong System limited warranty covers the installation integrity for the length of the flooring product warranty plus 10 years. To qualify for the Strong System Warranty, any subfloor preparation product needed for an installation must be an Armstrong Flooring product.

E. For the System Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

F. When Armstrong Flooring Strong System subfloor preparation products are used with other manufacturers' floor coverings, adhesives, or other subfloor preparation products, Armstrong Flooring warrants our products to be free from manufacturing defects from the date of purchase through the limited warranty period of 15 years.

1.12 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials from same production run as products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Quantity: Furnish quantity of flooring units equal to 5% of amount installed.
2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage, and protection of extra material.

2.00 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer:
   1. Armstrong Flooring, Inc.
   2. Or equal.

2.02 MATERIALS

A. Exchange™ Luxury Flooring by Armstrong Flooring, Inc.

   1. Description: A layered construction consisting of a tough, clear, rigid vinyl wear layer protecting a high-fidelity print layer on a solid vinyl backing. Protected by a diamond-infused UV-cured polyurethane finish, the wear surface is embossed with different textures to enhance each of the printed visuals. Colors are insoluble in water and resistant to cleaning agents and light.
   2. Reference specification - ASTM F 1700, “Standard Specification for Solid Vinyl Tile", Class III, Type B – Embossed Surface. Meets requirements for size, squareness, thickness, thickness of wear layer, residual indentation, resistance to chemicals, resistance to light and resistance to heat.
   3. Pattern and Color: To be selected by architect.
   4. Size: [6 in. x 36 in. (152 mm x 914 mm)].
   5. Wear layer thickness: 0.020 in. (0.5 mm).

2.03 ACCESSORIES

A. For patching, smoothing, and leveling monolithic subfloors (concrete, terrazzo, quarry tile, ceramic tile, and certain metals), provide Armstrong [S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-463 Level Strong™ cement based self-leveling compound] [S-466 Patch Strong™ flexible patching and smoothing compound].

B. [For priming porous substrates to aid in adhesive bond strength and reducing subfloor porosity, provide S-464 Prime Strong™ acrylic primer for porous substrates. For non-porous substrates, provide S-465 NP Prime Strong™ acrylic primer for non-porous substrates].

C. [For creating a moisture barrier, provide S-462 Seal Strong™ two-part moisture mitigation system].

D. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.

E. Provide transition/reducing strips tapered to meet abutting materials.

F. Provide threshold of thickness and width as shown on the drawings.

G. Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl, or rubber composition, tapered or bullnose edge, with color to match or contrast with the flooring, or as selected by the Architect from standard colors available.

H. Provide metal edge strips of width shown on the drawings and of required thickness to protect exposed edges of the flooring. Provide units of maximum available length to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.

3.00 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog, installation instructions, and product carton instructions for installation and maintenance procedures as needed.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (i.e., moisture tests, bond test, pH test, etc.).

B. Visually inspect flooring materials, adhesives, and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim.

C. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.

D. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.

E. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.

F. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.03 PREPARATION

A. [Subfloor Preparation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with Armstrong Flooring [S-184 Fast-Setting Cement-Based Patch and Underlayment][S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-463 Level Strong™ cement based self-leveling compound] [S-466 Patch Strong™ flexible patching and smoothing compound] [S-464 Prime Strong™ acrylic primer for porous substrates] [S-465 NP Prime Strong™ acrylic primer for non-porous substrates] as

recommended by the flooring manufacturer. Refer to Armstrong Flooring Guaranteed Installation Systems instructions and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.].

B. [Subfloor Preparation Moisture Mitigation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, mitigate moisture and other defects with Armstrong Flooring [S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-463 Level Strong™ cement based self-leveling compound] [S-466 Patch Strong™ flexible patching and smoothing compound] [S-462 Seal Strong™ two-part moisture mitigation system] [S-464 Prime Strong™ acrylic primer for porous substrates] [S-465 NP Prime Strong™ acrylic primer for non-porous substrates] as recommended by the flooring manufacturer. Refer to Armstrong Flooring Guaranteed Installation Systems instructions and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.].

C. Subfloor Cleaning: The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers, and other foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents. Spray paints, permanent markers and other indelible ink markers must not be used to write on the back of the flooring material or used to mark the concrete slab as they could bleed through, telegraphing up to the surface and permanently staining the flooring material. If these contaminants are present on the substrate, they must be mechanically removed prior to the installation of the flooring material. Refer to the Armstrong Flooring Guaranteed Installation Systems instructions and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.

D. When using S-995 Adhesive, perform subfloor moisture testing in accordance with ASTM F 2170, “Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes” and Bond Tests as described in publication instructions "Armstrong Flooring Guaranteed Installation System," to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Internal relative humidity of the concrete shall not exceed 99%. On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

E. [When using S-319 Adhesive, perform subfloor moisture testing in accordance with ASTM F 2170, “Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes” and Bond Tests as described in "Armstrong Flooring Guaranteed Installation System," instructions to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Internal relative humidity of the concrete shall not exceed 99%. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained].

F. [When using S-1000 Adhesive, perform subfloor moisture testing in accordance with [ASTM F 2170, “Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes”] [ASTM F 1869,“Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride”] and Bond Tests as described in "Armstrong Flooring Guaranteed Installation System" instructions to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. [Internal relative humidity of the concrete shall not exceed 100%.] [MVER shall not exceed 14 lbs./1000 sq. ft./24 hrs.] On installations where both the

Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained].

G. Concrete pH Testing: Perform pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained.

H. Wood subfloors: Armstrong resilient floors are recommended on suspended wood subfloors with a 1/4" underlayment (see product installation systems for exceptions) and a minimum of 18" of well-ventilated air space below. Armstrong Flooring does not recommend installing resilient flooring on wood subfloors applied directly over concrete or on sleeper-construction subfloors. Loading requirements for subfloors are normally set by various building codes on both local and national levels. Trade associations such as APA–The Engineered Wood Association provide structural guidelines for meeting various code requirements. Subfloor panels are commonly marked with span ratings showing the maximum center-to-center spacing in inches of supports over which the panels should be placed.

1. Refer to the Armstrong Flooring Guaranteed Installation Systems instructions and ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use under Resilient Flooring for additional information.

I. Wood subfloors - Surface Cleaning: Make subfloor free from dust, dirt, grease, and all foreign materials.

1. Check panels for sources of discoloration such as contamination from paint, varnish, stain overspray or spills, plumbing sealers, asphalt, heater fuel, markers, or potential staining agents such as wood or bark not visible on the surface, edge sealers, logo markings, printed nail patterns and synthetic patches.
2. Remove old adhesive.
3. Cover adhesive, oil, or wax residue with an appropriate underlayment. If the residue is tacky, place a layer of felt or polyethylene sheeting over it to prevent a cracking sound when walking on the floor.
4. Remove all paint, varnish, oil, and wax from all subfloors. Many buildings constructed before 1978 contain lead-based paint, which can pose a health hazard if not handled properly. State and federal regulations govern activities that disturb lead-based painted surfaces and may also require notice to building occupants. **Do not remove or sand lead-based paint without consulting a qualified lead professional for guidance on lead-based paint testing and safety precautions.** Armstrong Flooring does not recommend the use of solvents to remove paint, varnish, oil, wax, or old adhesive residues because the solvents can remain in the subfloor and negatively affect the new installation. Whenever sanding, be certain the work site is well ventilated and avoid breathing dust. If high dust levels are anticipated, use appropriate National Institute for Occupational Safety and Health (NIOSH) designated dust respirator. All power sanding tools must be equipped with dust collectors. Avoid contact with skin or eyes. Wear gloves, eye protection and long-sleeve, loose fitting clothes
5. For additional information on the installation and preparation of wood and board-type underlayments see the current edition of ASTM F1482, “Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring.”
6. Vacuum or broom-clean surfaces to be covered immediately before the application of flooring.

3.04 INSTALLATION

A. Install flooring in strict accordance with the latest edition of Armstrong Flooring Guaranteed Installation Systems instructions. Failure to comply may result in voiding the manufacturer's warranty listed in Sections 1.10 and 1.11.

B. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.

C. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.

D. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.

E. Roll with a 100-lb. (45.36 kilogram) roller in the field areas. Refer to specific rolling instructions of the flooring manufacturer.

F. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

G. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.

H. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.

I. Apply [butt-type] [overlap] metal edge strips where shown on the drawings, [before] [after] flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations

3.05 CLEANING

A. Perform initial and on-going maintenance according to the latest edition of the maintenance recommendations for Exchange™. Remove excess sealants, glazing materials, dirt, and other substances.

3.06 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings. (See Finishing the Job in the latest edition of Armstrong Flooring Guaranteed Installation Systems instructions.

END OF SECTION

SECTION 09 65 20
VINYL BASED TILE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Vinyl based tile flooring as indicated.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 03 31 00 - Cast-in-Place Concrete.

5. Section 09 65 13 - Rubber Base.

1.02 DEFINITIONS

A. Pop-up: A pop-up is defined as any surface deviation or looseness of substrate that is equal to or greater than 1/64 (0.015625) inch above the concrete floor level, regardless of the size.

1.03 SUBMITTALS

A. Procedure: In compliance with Section 01 33 00.

B. Product Data: Submit manufacturer's published technical data describing materials, construction and recommended installation instructions. Submit technical data and installation instructions for each adhesive material. Submit list and Product Data of recommended finish materials.

C. Maintenance Instructions: Submit manufacturer's recommendations for maintenance, care, and cleaning of vinyl composition tile.

D. Samples: Submit Samples of vinyl composition tile and any reducers or transitions in each available color and pattern. Following color selections, submit full size samples of each selected color and pattern. Submit pint cans of each type of adhesive.

E. Maintenance Materials: Before Substantial Completion, deliver one unopened container of each color and pattern of vinyl composition tile in each color and pattern installed. Label each container indicating locations installed. Include unopened cans of adhesives adequate to install the maintenance materials.

1.04 QUALITY ASSURANCE

A. Qualifications of Installer: Minimum five (5) years experience in successfully installing the same or similar flooring materials.

B. Qualifications of Supervising Installer: In addition to the qualifications of the installer listed above, the flooring installer's supervisor shall have a minimum of 10 hours Cal-OSHA safety training.

C. Pre-Installation and Progress meetings: Prior to start of work of this section and after approval of submittals, schedule on-site meetings between Contractor, Supervising Installer, OAR and Project Inspector to review installation and procedures required for project.

D. Comply with the following as a minimum requirement:

1. Materials shall be compliant with requirements of CBC Chapter 11B and ADAAG.

2. ASTM E84: Class A Flame Spread Rating of 25 or less.

3. Comply with current CHPS requirements, www.chps.net.

4. Moisture Testing: ASTM F1869.

1.05 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the Project site in original unopened manufacturer's packaging clearly labeled with manufacturer's name.

B. Materials shall be stored at room temperature, but not less than 70 degrees F for not less than 48 hours before installation, unless manufacturer's instructions specify otherwise.

1.06 PROJECT CONDITIONS

A. Ventilation and Temperature: Verify areas that are to receive new flooring are ventilated to remove fumes from installation materials. Verify that areas are within temperature range recommended by the various material manufactures for Project site installation conditions.

1.07 WARRANTY

A. Manufacturer shall provide a fifteen-year material warranty.

B. Installer shall provide a two-year fabrication and installation warranty.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. AHF Contract

B. Or equal.

2.02 MATERIALS

A. Vinyl Based Tile: 12-inch by 12-inch by 2.5 mm thick, colors to be selected by architect.

1. Tile shall be from same batch and run number for each color.

B. Crack Filler and Leveling Compound: 100 percent cementitious binder type (as defined by ASTM C150), shall be approved by Owner's Office of Environmental Health and Safety (OEHS). The following manufacturers are currently listed approved by OEHS:

1. Webcrete #95 as manufactured by Durabond.

2. Ardex SD-F.

3. Armstrong S183 or S184.

4. Equal, as recommended by flooring manufacturer and approved by OEHS.

5. Leveling Compound shall meet or exceed 200 pounds when tested in accordance with ASTM C 1583.

C. Concrete Primer: Non-staining type in accordance with ASRM F710. Concrete primer shall be OEHS approved.

D. Adhesive: Water based, low odor type formulated specially for installation with vinyl composition tile, and recommended by manufacturer.

E. Reducer Strips: Tapered rubber not less than one-inch wide, and thickness to match tile.

PART 3 - EXECUTION

3.01 COORDINATION

A. Coordinate with related Work to assure level, dry, smooth, and clean finish surfaces to receive vinyl composition floor tile.

3.02 EXAMINATION

A. Field verify and correct deficiencies of conditions affecting Work before commencing Work of this section.

3.03 PREPARATION OF CONCRETE SLABS

A. Do not start preparation until underlying concrete floor slabs are at least 90 days old. Any leveling compound under a vapor or moisture barrier shall be warranted to be installed in a wet or moist environment without moisture limitations.

B. Leveling: Check sub-floors for true to level and plane within the tolerance listed in Manufacturer's installation instructions. Test floor areas both ways with a 10-foot straightedge and repair high and low areas exceeding allowable tolerance. Pop ups shall be hammered out and floor filled with an approved cementitious leveling compound. Remove high areas by power sanding, stone rubbing or grinding, chipping off and filling with an approved leveling compound, or equivalent method. Fill low areas with an approved leveling compound. Repair and level surfaces having abrupt changes in plane, such as trowel marks or ridges, whether or not within allowable tolerance. Clean areas where repairs are performed.

C. Cracks or Depressions: Fill voids with an approved cementitious leveling compound of the type recommended by flooring manufacturer for the specific Work conditions.

D. Cleaning: After leveling, clean substrates of deleterious substances and foreign matter.

E. Moisture Testing: Test new and old concrete slabs for adequate dryness.

1. Testing shall conform to ASTM F1869, and the following. Minimum testing requirements are three calcium chloride tests for the first 1,000 square feet of floor area, and one for each additional 1,000 square feet or fraction thereof. Unless more stringent requirements are recommended by flooring manufacturer, maximum allowable moisture release at time of flooring installation shall be three pounds per 24 hours per 1,000 square feet, or as recommended by flooring manufacturer. Provide results of moisture test to the OAR.

2. Test concrete for alkalinity. An acceptable range is between pH5 to pH9. Excessive alkalinity shall be neutralized, using manufacturer's recommended methods, prior to installation of floor covering.

3. Delay application of flooring until sub-floors are sufficiently dry according to flooring manufacturer's recommendations, or perform remedial measures as recommended by flooring materials manufacturer.

F. Install underlayment according to manufacturer's instructions.

G. Sweep floors and vacuum sanding dust.

3.05 INSTALLATION OF TILE

A. Color and pattern: Install tiles in the pattern indicated on Drawings. If no pattern is indicated, tiles shall be installed in a rectangular pattern according to manufacturer's instructions, in one color.

B. Special designs and school logo:

1. Fabricate of sizes and colors indicated on drawings and from electronic file provided by Architect.

2. Precision cut VBT tiles using either computer aided water-jet or laser technologies to a tolerance of 0.005 inch.

C. Install vinyl composition floor tile in ambient temperatures according to manufacturer's range.

D. Install the tile adhesive in a thin film evenly with a notched trowel. Trowel notches shall be as recommended by adhesive manufacturer.

1. Mix adhesive in accordance with manufacturer's instructions.

2. Install adhesive only in area that can be covered by flooring material within the adhesive manufacture's recommended working time. Do not set tile into wet adhesive.

3. Tile must be set into dry, but still tacky, adhesive film. Remove adhesive that has dried beyond recommended time, or has filmed over and is no longer tacky.

4. Adhesive application rate shall be as required to avoid telegraphing trowel lines to the surface after maintenance coatings are applied. Adjust tile runoff during installation if necessary.

5. Immediately remove any excess adhesive from the tile surface using the adhesive manufacturer's recommended cleaner and a damp, not wet, cloth.

E. Provide reducer where floor covering edges are exposed, such as at center of the door or where floor coverings terminate.

F. Install tiles symmetrically about centerlines of areas progressing toward walls. Adjust border tiles as required. Tiles shall be straight and joints close. Tile shall be cut to fit snugly at doorframes, and walls. No slivers at edges.

G. Mechanically cut flooring material to produce square true edges.

H. As floor tile is installed and within adhesive's recommended working time, roll with a clean, smooth, 100-pound roller in both directions. As the rolling proceeds, replace any loosened, defective, or damaged tile with new and finish to the specified condition.

I. Remove dust, debris, and soil with any combination of sweeping, micro-fiber dust-mopping with a properly treated, non-oily mop and vacuuming.

3.07 CLEAN UP

A. Maintain flooring surfaces clean as installation progresses. Do not wet wash, machine scrub, or strip the floor for at least five days after installation.

B. Remove rubbish, debris, and waste materials and legally dispose of off Project site.

C. Remove any dried adhesive residue with a clean, white cloth dampened with mineral spirits, carefully following warnings on the container.

D. Scrub the floor using a rotary machine or auto scrubber with a properly diluted neutral detergent solution Of a Commercial Floor Cleaner and the appropriate scrubbing pad or brush (aggressiveness equivalent to 3M™ red pad for light scrub, 3M™ blue pad or equal for a deep scrub).

E. Thoroughly rinse the entire floor with fresh, clean water. Remove rinse water and allow the floor to dry completely.

3.08 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 09 68 13
CARPET TILE

PART 1 – GENERAL

1.01 SUMMARY

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

B. Section Includes:

1. Carpet Tile as indicated.

C. Related Sections:

1. Division 03 31 00 - Cast-In-Place Concrete.

1.02 SUBMITTALS

A. Shop Drawings: Submit dimensioned layout of carpet tile and details for binder bars.

B. Samples:

1. Submit minimum 3 labeled Carpet Tile actual size with proper backing. Carpet Style and Color as selected by Owner/Architect.

2. Trim and accessories: Submit 12-inch long Samples of each type trim proposed for the Work.

C. Product Data: Submit the following:

1. Carpet Tile manufacturer's published technical data fully describing carpet materials, construction, and recommended installation directions.

2. Technical data and installation instructions for each adhesive and sealer material.

3. Carpet Tile manufacturer's published instructions for maintenance, care, cleaning and repair of carpet.

4. MSDS on all Manufacturers recommended adhesives and primers.

D. Certificate:

1. Submit a certificate from carpet tile manufacturer that materials supplied comply with fire hazard resistance standards specified.

2. Submit a manufacturer certification that the installer(s) is approved by the manufacture to install the specified product.

E. Installer's/Subcontractor's Experience Qualifications: Submit list of not less than 5 projects with similar scope of work, extending over period of not less than 5 years, indicating installer's experience record.

1.03 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement:

1. Manufacturer's installation instructions

2. All materials shall comply with the recommendations of the CBC 11B-302.2.

3. CHPS Low Emitting Materials Table: Materials submitted must be listed as Low Emitting on the following web site: www.CHPS.net. Be compatible with the selected carpet tile and approved by carpet manufacture.

4. All chemically based products such as sealers, primers, fillers, adhesives, etc. must be approved by owner's office of the Environmental Health and Safety (OEHS).

5. Carpet tile must be free of Anti-Microbial Protection.

B. Requirements of Regulatory Agencies: Carpet Tile shall meet requirements of federal, state and local regulatory agencies for flammability, static control, or other properties as specified with testing documentation from the manufacturer by a third party laboratory.

C. Carpet Tile Installation: Comply with CRI 104 - Standard for Installation of Textile Floor Covering Materials.

D. Each color of carpet tile shall be of the same dye lot.

E. Qualifications of Installer: Minimum 5 years experience in successfully installing the same or similar flooring materials.

F. Qualifications of Supervising Installer: In addition to the qualifications of the installer listed above, the flooring installer's supervisor shall have a minimum of 10 hours Cal-OSHA safety training.

G. Pre-Installation and Progress meetings: Prior to start of work of this section and after approval of submittals, schedule an on site Pre-Installation and progress meetings between Contractor, Supervising Installer, OAR and IOR to review construction, drawings and installation procedures in accordance with the requirements of this specification.

1.04 DELIVERY, STORAGE AND HANDLING

A. Full cartons of carpet tile shall be packaged and identified by the flooring manufacturer. Distributor, dealer, or vendor cutting, re-packaging, and re-labeling is not permitted.

B. Store material at least 48 hours at room temperature prior to installation and in accordance to all manufacturers' instructions.

C. Deliver fire-rated materials with testing agency labels and required fire classification numbers attached and legible.

1.05 JOB CONDITIONS

A. Ventilation and Temperature: Verify areas to be carpeted are ventilated to remove any off gassing from installation materials, and areas are within temperature range recommended by the various material manufacturers for Project site installation conditions. The temperature of a concrete slab must be stabilized above 65 degrees both 12 hours prior to and after the installation. The following environmental conditions inside the building are critical for proper installation. Temperature must be between 65 degrees F and 95 degrees F and the humidity between 10% and 65% for at least 72 hours before and 72 hours after installation. In addition, any adhesives and primers should be stored under these conditions for a minimum of 24 hours prior to installation.

B. Protection: Prohibit traffic on carpet for at least 12 hours after installation. Cover carpet with heavy non-staining kraft paper in areas where the Work of other trades is to be performed and/or traffic and passage areas. Protect carpet from damage or soiling. Maintain protection in place until Substantial Completion.

1.06 WARRANTY

A. Contractor shall provide a 2 year labor warranty.

B. Manufacturer: Lifetime commercial limited.

1.07 MAINTENANCE

A. Extra Materials: Provide minimum 3 cartons of extra materials for each color, pattern, and dye lot of carpet.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND PRODUCTS

A. Modular Carpet Tile: Commercial 24” x 24” multi-level loop.

B. Approved Manufacturer/Products/Systems: (Basis of Design)

1. Shaw, Light Series, Style #5T004.

a. Product: Nylon Solution Dyed, moisture guard.

b. Colors as selected by Architect.

2.02 MATERIALS

A. Carpet tile shall meet the following minimum standards:

1. Dye Method: 100 % Solution Dyed Method.

2. Construction: Maximum 24” x 24” Modular Carpet Tile. Multi-level loop.

3. Pile / Yarn weight: Minimum 22 oz per square yard.

4. Minimum Density: Not less than 5,000

5. Moisture Impervious: Carpet Tile shall be unaffected by water and moisture.

6. Static Protection: The manufacturer warrants that the carpet tile will not static discharge in excess of 3.5 KV or under when tested under the AATCC Test Method 134 for the life of the carpet.

7. Calcium Chloride: Carpet Tile shall be able to be installed with 5 lbs. hydrostatic pressure or better (pounds) per 1000 square feet per 24 hours with a written documentation from manufacturer, per CRI-104.

8. Fluorochemical Treatment: Minimum of 500 parts per million: per CRI-102; after two hot extractions (AATCC171), minimum 400 Parts per Million per CRI TM-102.

9. Traffic Classification: Class III – Extra Heavy Commercial Traffic (more than 1000-foot traffic per day).

10. GSA Certification: All carpet tiles shall meet or exceed the General Services Administration requirements.

11. Flammability:

a. Flooring Radiant Panel: Class I- per ASTM E 648

b. NBS Smoke Density: Less than 450 per test ASTM E 662; NFPA-258

c. Flame Resistant: Shall pass Methenamine pill test ASTM E 662.

d. All materials shall meet requirements of California Proposition 65. In case of fire, no material shall be used that emit gas and is prohibited by California Proposition 65.

12. Run Resistant Strength: Not less than 25 lbs., in accordance with the Loop Pile Run Resistance test (TP 155-86), wet or dry for a minimum of 30 years.

13. Indoor Air Quality: Carpet tile and adhesion systems shall meet or exceed CRI & EPA guidelines (green label plus certified and labeled) and may not contain any

VOC's such as: 4PCH (4 phenulcyclohexeneor, SBR latex (Styrene Butadiene Rubber).

14. Recycling Program: Carpet tile shall be eligible for a recycling program (the carpet tile will be recycled and no part of the reclaimed carpet enters a landfill) either through the carpet tile manufacturer or fiber manufacturer. If project scope included removal and disposal of existing carpet or carpet tile, contractor is responsible for delivery to a certified recycling center. A recycling certificate must be submitted to OAR, with its name and address of location of recycling center, date and weight of carpet recycled. Contractor is responsible for all costs associated with recycling.

B. Carpet tile shall be from one dye lot, unless otherwise authorized by the Architect, or the OAR.

C. Full cartons of carpet tile shall be cut, packaged, and identified by the factory. Distributors, dealers and vendor cutting, re-packaging, and re-labeling are not permitted.

D. Carpet Edge Strips: A-600-SH Silver Clamp Down manufactured by Universal Metals, or equal.

E. Adhesive: Water-resistant latex-based adhesive recommended by carpet tile manufacturer for re-leasable adhesive carpet tile installation. Where primers or sealers are furnished, verify their compatibility with adhesive.

F. Crack Filler and Leveling Compound: 100% cementitious binder type (as defined b ASTM #C-150), shall be approved by Owner's Office of Environmental Health and Safety (OEHS). The following manufacturers are currently listed as approved by OEHS:

1. Webcrete # 95 as manufactured by Durabond

2. Ardex SD-F as manufactured by Ardex

3. Or as recommended by flooring manufacturer and approved by the Owner's Office of Environmental Health & Safety.

4. Leveling Compound shall meet or exceed 200 pounds when tested in accordance with ASTM 1583.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Before installation is started, examine surfaces to receive carpet tile. Deficiencies shall be corrected before starting Work of this section.

B. Field verify dimensions and other conditions affecting this Work before commencing carpet tile installation.

3.02 PREPARATION

A. Provide concrete moisture vapor emission and pH testing to all concrete specified to be covered with carpet tile. Includes concrete placed below, on and above grade. For replacement projects, concrete slabs not in direct contact with ground may be excluded from this requirement.

B. Testing shall take place after allowing concrete to dry for a minimum of 90 days. Testing to be scheduled no less than 1 or more than 3 weeks prior to scheduled flooring installation.

C. Quantification of Concrete Moisture Vapor Emissions

1. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for 48 hours prior and during test period. If meeting this criteria is not possible, then minimum conditions should be 75± 10°F

and 50± 10% relative humidity. When a building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be included with the test report.

2. The number of vapor emission test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 in the first 1,000 sq.ft. and 1 per each additional 1,000 square feet.

3. Tests sites are to be cleaned of all adhesive residue, curing compounds, paints, sealers, floor coverings, etc. 24 hours prior to the placement of test kits.

4. Weigh test dish on site prior to start of test. Scale must report weight to 0.1 grams. Record weight and start time.

5. Expose Calcium Chloride and set dish on concrete surface.

6. Install test containment dome and allow test to proceed for 72 hours.

7. Retrieve test dish by carefully cutting through containment dome. Close and reseal test dish.

8. Weigh test dish on site recording weight and stop time.

9. Calculate and report results as “pounds of emission per 1,000 sq.ft. per 24 hours”

10. Follow manufacturer’s corrective measures accordingly. Moisture vapor emission must meet manufacture’s recommendation prior to installation.

D. Quantification of pH Level

1. At each vapor emission test site, after removal of test containment dome, perform pH test.

a. Place several drops of water onto the concrete surface to form a puddle approximately 1” in diameter.

b. Allow the water to set for approximately 60 seconds

c. Dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading

d. Acceptable range is pH5 to pH9. Excessive alkalinity shall be neutralized prior to installation of the carpet tile.

e. Record and report results.

f. Follow manufacturer’s corrective measures accordingly.

E. Preparation of Subfloors: Any leveling compound used over a vapor or moisture barrier will be warranted to be installed in a wet or moist environment without moisture limitations.

1. Delay application of flooring until sub-floors are sufficiently dry according to flooring manufacturer’s recommendations, or perform remedial measures as recommended by flooring materials manufacturer.

F. Cleaning and Drying: Clean concrete floor slabs of all oil, grease, waxes, curing compounds, dust, dirt, debris, paint, and other deleterious substances. Failure to remove or seal old adhesives or other floor coatings may result in installation failure. Provide a commercial vacuum cleaner to remove dust and dirt. Do not furnish oiled or chemical treated sawdust or any similar product for dust removal.

G. Leveling: Verify floor slabs true to level and plane within a tolerance of 3/16 inch in 10-feet. Test floor areas both ways with a 10-foot straightedge and repair all high and low areas exceeding allowable tolerance. Pop ups shall be hammered out and floor filled with an approved cementitious leveling compound. Remove high areas by power sanding, stone rubbing or grinding, chipping off and filling with an approved cementitious leveling

compound, or equivalent method. Fill all low areas with an approved cementitious leveling compound. Repair and level the surfaces having abrupt changes in plane, such as trowel marks or ridges, whether or not within the allowable tolerance. Again clean areas where repairs are performed and prime floor using recommended primer by manufacture. Do not sand, stone rub grind or power chip floor adhesives that contain asbestos.

H. Wood subfloors: Clean wood subfloors of all oil, grease, waxes, dust, dirt, debris, paint, and other deleterious substances. Do not furnish oiled or chemical treated sawdust or any similar product for dust removal. Sand off projecting ridges. If recommended by carpet tile manufacturer, prime floors with a recommended primer, compatible with adhesives to be installed.

I. Conditioning of Materials: Carpet tile and adhesives shall be conditioned at the Project site at not less than 65 degrees F and relative humidity between 10 percent and 65 percent for 48 hours prior to installation and in accordance to manufacturer's instructions.

J. Floors should be level and sound. Any trowel marks from old adhesives must be sanded smooth, creating a level surface prior to the application of adhesives and/or primers.

3.03 CARPET TILE INSTALLATION

A. General: Install carpet tile in accordance with requirements of CRI 104, except where more stringent requirements are specified herein or recommended by carpet materials manufacturers.

B. Install carpet tiles in each dye lot in the number sequence as furnished by manufacturer. Measure the area to find the best starting point that will utilize a maximum size perimeter tile. After selecting the starting point, snap a chalk line that bisect this point by at right angles. To achieve a perfect angle form a triangle by measuring 6" up from the center point. Then measure 8" out from the center point. Then, find a 10" angle between these two points. (See manufacturers written instructions for complete details).

C. Color Control: Install dye lot in the number sequence at locations indicated to prevent shading variations. Install only one dye lot for each area of building unless otherwise reviewed. If more than one dye lot is required, obtain prior review of color match between dye lots by Owner and its representative's written approval.

D. Carpet Tile Fit: Refer to the layout Shop Drawings. The corners of the carpet tiles should be flat to assure a proper fit. Install the carpet tiles snuggly. Be careful to not to over tighten the installation.

E. Laying and Seaming: Cut carpet tiles for seams between rows and prevent damage to loops, prevent edge ravels, and preserve uniform row alignment and spacing on both sides and across seams. Install carpet tiles with loop rows in straight lines both ways, free of offsets, waviness, distortion, or misalignment. Cut seam edges straight and square with backing. Trim carpet tiles at walls, columns, and penetrations for a compressed fit.

F. Doorways: Extend carpet tiles into doorways without piecing in and seam to the carpet on other side of door under door centerline except where metal thresholds occur; no small filler pieces of carpet tiles will be permitted at doorways.

G. Adhesive Installation: Provide proper equipment as required by manufacturer. Evenly spread adhesive free of excess or thin areas. Place and lay carpet tile within open time of adhesive.

H. Binder Bars: Provide bars at all edges of carpet tiles not abutting walls or other construction, securely fastened in place by using aluminum drive nails. Precisely align splices and tightly miter angles.

3.04 PROTECTION

A. Protect the Work of this section until Substantial Completion. Limit rolling traffic on carpet tiles for at least 12 hours after installation. Cover carpet tiles with heavy non-staining kraft paper in areas where the Work of other trades is to be performed and/or traffic and passage areas. Protect carpet from damage or soiling. Maintain protection in place until Substantial Completion.

3.05 CLEANING

A. As each carpeted area is completed, clean up all dirt and debris, remove spots and soiling with proper cleaner, trim off loose threads with sharp scissors, and vacuum entire area clean.

B. Carpet Extractor Solution High Sierra Impact EES.

3.06 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.07 INSTRUCTION

A. Before Substantial Completion of the Work, should the district request and at the districts discretion, provide a 4 hour Owner instruction period for proper maintenance of carpeting. Instructions shall be provided by technical representative of manufacturer.

END OF SECTION

SECTION 09 84 33
ACOUSTICAL WALL AND CEILING TREATMENT
(CEMENTITIOUS WOOD FIBER WALL PANELS)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Cementitious wood fiber plank acoustical Wall panel system and installation accessories.

B. Related Sections:

1. Division 9 Section: Acoustical Ceilings.

1.2 REFERENCES

C. ASTM International:

1. ASTM C635 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

3. ASTM E1264 Standard Classification for Acoustical Ceiling Products.

D. Ceilings and Interior Systems Construction Association (CISCA):

1. CISCA Code of Practices.

1.3 SYSTEM DESCRIPTION

E. Performance Requirements:

1. Provide acoustical wall panel assembly designed and tested to provide surface burning characteristics (ASTM E84) as follows:

a. Flamespread: 5.

b. Smoke Developed: 15.

2. Provide acoustical wall panel system which has been manufactured, fabricated and installed to provide Noise Reduction Coefficient (NRC) rating as follows:

a. 1.00

1.4 SUBMITTALS

F. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

G. Product Data: Submit manufacturer's product data and installation instructions.

1. Recommended procedures for normal cleaning and removal of stains including precautions in use of cleaning materials that may be detrimental to surfaces.

H. Samples: Submit selection and verification samples: 6 inch × 6 inch (152 × 152 mm) sample for each wall panel unit required, showing full range of exposed texture to be expected in completed work.

I. Quality Assurance/Control Submittals: Submit the following:

1. Test Reports: Upon request, submit certified test reports from recognized test laboratories.

2. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

J. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.

K. Regulatory Requirements and Approvals: Comply with requirements below.

1. State of California:

a. DSA Number PA-008.

1.6 DELIVERY, STORAGE & HANDLING

L. General: Comply with Division 1 Product Requirement Section.

M. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1. Prevent soiling, physical damage or wetting.

2. Store cartons open at each end to stabilize moisture content and temperature.

1.7 PROJECT/SITE CONDITIONS

N. Environmental Requirements:

1. Do not install acoustical panels until building is closed in and HVAC system is operational.

2. Locate materials onsite at least 24 hours before beginning installation to allow materials to reach temperature and moisture content equilibrium.

3. Maintain the following conditions in areas where acoustical materials are to be installed 24 hours before, during and after installation:

   a. Relative Humidity: 65 - 75%.

   b. Uniform Temperature: 55 - 70 degrees F (13 - 21 degrees C).

1.8 MAINTENANCE

O. Extra Materials: Provide five percent additional material for use by owner in building maintenance and repair.

P. Provide new unopened cartons of extra materials, packaged with protective covering for storage, identified with appropriate labels.

PART 2 - PRODUCTS

2.1 ACOUSTICAL WALL PANEL SYSTEM

A. Manufacturer: Tectum Inc.

1. Contact: 105 South Sixth Street, Newark, OH 43055; Telephone: (888) 977-9691, (740) 345-9691; Fax: (800) 832-8869; E-mail: info@tectum.com; website: www.tectum.com.

B. Proprietary Systems. Acoustical Wall and Ceiling Panel Systems, including the following:

1. Tectum Finalé Panels:

   a. Material: Aspen wood fibers bonded with inorganic hydraulic cement.

   b. Thickness: 1 inch (25.4 mm) baseboard + 1 inch (25.4 mm) Tectum furring with SoniCor fiber core between furring.

   c. Edge: Long edges beveled.

   d. Width: 23¾ inches (603 mm).

   e. Length: 144 inches (Varies).

   f. Color: Factory painted white.

   g. Mounting Style: “A”. Provide all fasteners for a complete single source installation.

2.2 ACCESSORIES

C. Provide accessories as follows:

1. Tectum Moulding:

a. Material: Plastic.

b. Designation: CHC or CHH as selected by architect.

c. Provide edge molding for bottom edge of wall panel typical (and any exposed edge).

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Comply with the instructions and recommendations of the acoustical wall panel system manufacturer.

B. Install materials in accordance with governing regulations, fire resistance rating requirements and industry standards applicable to work.

1. Comply with CISCA Code of Practices.

3.2 EXAMINATION

C. Site Verification of Conditions:

1. Examine surfaces scheduled to receive suspended or directly attached acoustical units for unevenness, irregularities and dampness that would affect quality and execution of work.

2. Do not proceed with installation of wall panel system until unacceptable conditions are corrected.

3.3 INSTALLATION

D. Screw head to be flush with panel surface.

E. Securely affix wall panels by means of splines attached vertically to smooth wall or furring strips. Engage vertical kerfs on the edges of the wall panels with splines. Apply adhesive or use Velcro hook and loop fastening where necessary.

F. Cover field cut edges by means of trim or other moldings.

3.4 CLEANING

G. Clean exposed surfaces of acoustical panel, trim, moldings and suspension members to comply with manufacturer's instructions for cleaning.

H. Touch up any minor finish damage.

I. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.5 PROTECTION

J. Protect installed work from damage due to subsequent construction activity, including temperature and humidity limitations and dust control, so that the work will be without damage and deterioration at the time of acceptance by the Owner.

END OF SECTION

SECTION 09 85 00
CONCRETE SEALER

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

A. Provisions of general, supplementary conditions, and Division 1 apply to all work in this Section.

B. Furnish labor, materials, equipment, and supervision to install chemical resistant coatings as specified and shown in drawings.

1.03 REFERENCES

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

1. ASTM D4060: Abrasion Resistance < 20 mg>

2. ASTM D3363: Pencil Hardness 4H

3. ASTM D2794: Impact Resistance 20 in. lbs.

4. ASTM D2047: Slip Resistance Passed.

5. ASTM D1308: Chemical Resistance 24 hr. Exp.

B. U.S.Department of Agriculture (USDA)

1.04 SUBMITTALS

A. Comply with Bidding Requirements Section 00600 Bonds and Certificates, and 00650 Certificates of Insurance.

B. Manufacturer's Technical Data Guides, and application instructions.

C. Submit laboratory tests or data that validate product compliance with compliance criteria specified.

1.05 QUALITY ASSURANCE

A. Manufacturer qualifications: Company regularly engaged in manufacturing and marketing of products specified in this section.

B. Contractor qualifications: Qualified to perform work specified by reason of experience or training provided by product manufacturer.

C. Notify manufacturer's authorized representative at least 2 weeks before start of work. Schedule minimum of 3 job site inspections by Manufacturer's authorized representative, first scheduled before application of product. Application of floor coating without prior notice will not constitute acceptance by manufacturer of two-year warranty inspection procedure.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in original factory packaging bearing identification of product, manufacturer, batch number, and expiration date as applicable. Provide Material Safety Data Sheets for each product.

B. Store product in location protected from freezing, damage, construction activity, precipitation and direct sunlight in strict accordance with manufacturer's recommendations.

C. Condition products to approximately 55 to 70 degrees F for use in accordance with manufacturer's recommendations.

D. Handle all products with appropriate precautions and care as stated on Material Safety Data Sheet.

1.07 PROJECT CONDITIONS

A. Do not use products under conditions of precipitation or freezing conditions. Use appropriate measures for protection and supplementary heating or cooling to ensure proper drying and curing conditions in accordance with manufacturer's recommendations if application during inclement weather occurs.

B. Protect all adjacent work from contamination due to mixing, handling, and application of sealants.

1.08 MOCKUP

A. Provide mockup to include surface cleaning and preparation techniques, aesthetics, for color and slip-resistance characteristics.

B. Apply mockup with specified floor coating and with other components noted.

C. Locate where directed by Architect.

D. Mockup may remain as part of Work if acceptable to Architect.

1.09 WARRANTY

A. Provide manufacturer's standard pre-approved material warranty, with completion of warranty forms.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. For purpose of defining quality of materials in this Section SEAL-KRETE, DIV. COVENIENCE PRODUCTS, ST. LOUIS, MO. conforms to requirements of this specification.

.

2.02 PERFORMANCE CRITERIA

A. Seal-Krete Dura-Shell:

1.	Vertical/Horizontal:	2 part Water-Base Urethane	
2.	Solids by weight:		66%±3% percent
3.	Solids by volume:		64%±3% gray 55%±3% clear
4.	Viscosity	ASTM D562	65-75 KU catalyzed
5.	Flash point:	ASTM D93	Greater than 185° degrees F
6.	Abrasion Resistance:	ASTM 4060	<20 milligrams lost
7.	VOC content:	ASTM 2697	<30 grams per liter
8.	Tensile Strength:	ASTM D4541	2473-2609 psi
8.	USDA Compliant		

2.03 MATERIAL

A. Clean-N-Etch: an etching solution used to clean and degrease bare concrete surfaces, and improve penetrations and adhesion of paint, stains, and coatings.

B. Clear Grip: a durable, micronized polymeric aggregate develop for use as an anti-skid additive to floor paints and sealers.

C. Use SEAL-KRETE PRODUCTS in all other instances and applications as recommended by manufacturer pertaining to this work to provide Owner with single source system and warranty.

3.00 EXECUTION

3.01 EXAMINATION

A. Inspect all areas involved in work to establish extent of work, access and need for protection of surrounding construction, equipment, windows and shrubbery.

B. Protect all surroundings from primer and floor coating to include, but not be limited to, windows, walkways, drives, and landscaping.

3.02 SITE VERIFICATIONS OF CONDITIONS

A. Conduct pre-application inspection of site verification with authorized SEAL-KRETE Representative.

B. Ensure floors are structurally sound and fully cured 28 days minimum.

C. Test floors for vapor drive in accordance with ASTM D4263.

D. Evaluate atmospheric, floor, and material temperatures. Do not apply materials if temperatures are below 60 or above 85 degrees F. Evaluate relative humidity. Do not apply materials if relative humidity is below 35 or above 80 percent.

E. Repair concrete and install joint sealants and fillers as directed by Engineer. Make all repairs in accordance with manufacturer's written instructions.

3.03 PREPARATION

A. Mechanically profile floor to medium grit sandpaper texture to remove curing and parting compounds, and other surface hardeners and floor coatings in accordance with manufacturer's instructions.

B. Clean floors of fat, grease, and oil not removed by mechanical means with Seal-Krete Clean-N-Etch in accordance with Manufacturer's instructions and ASTM D4258.

C. Conduct inspection of surface preparation with authorized Seal-Krete Representative

3.04 APPLICATION

A. Seal-Krete Dura-Shell:

1. Stir Dura-Shell, Component A and B separately before mixing. Combine Part A and B and mix with Jiffy mixer blade and electric drill at slow speed for 2-3 minutes in accordance with manufacturer's written instructions. Scrape side of container several times while mixing. The two parts will thicken as they are mixed. Allow to sit for 2 minutes, then reduce to desired viscosity with potable water. When desired viscosity is achieved, apply immediately (pot life: 1.5-2 hours).

   Reduction with clear tap water:
   Vertical surfaces: 1 pint
   Horizontal surfaces: 1 pint (Grays)
   Horizontal surfaces: 1 quart (Clears)

2. Apply by Spray or roller at 250-400 square feet per gallon to achieve 4-5 wet mils minimum or 2.4-3 dry mils Vertical surfaces. Do not over-apply. Horizontal Surfaces, apply at 250-400 square foot per gallon or (6-8 wet mils) or 3.6 – 4.8 dry mils.)

   Notation: Decorative paint flakes may be added to 2 Part Urethane Gray(s) final coat.

3. Allow to cure minimum of 24 hours but no more than 48 hours at 75 degrees F and 50 percent relative humidity before application of finish coat. Lower temperature and higher relative humidity will extend drying time. Higher temperature and lower relative humidity will shorten drying time.

4. Provide clear grip material, in a two-coat application which shall be required for all areas.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Service. Final inspection: Warranty request. Manufacturer's representative will inspect finished surface preparation, application, and finished coating and may require further preparation or application to achieve appropriate result.

3.05 CLEANING

A. Clean tools immediately with water or a 50/50 mixture of water and Isopropyl Alcohol. Dispose of container and contents in accordance with local laws and regulations. Keep from freezing.

B. Remove all debris related to application of floor coatings from job site in accordance with all applicable regulations for hazardous waste disposal.

END OF SECTION

SECTION 09 90 00
PAINTING

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

Provide painting work as specified and as shown, complete. The work includes cleaning and preparation of all surfaces to be painted or finished, and the painting and finishing of all surfaces unless hereinafter excluded.

A. Paint all exposed surfaces except where material is obviously intended and specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas. If system, color or finish is not designated, the Architect will select these from colors available for the materials systems as specified. The standard for all color selections will be from standard colors of Dunn -Edwards's coatings.

B. In existing buildings, unless specifically noted otherwise, paint only walls where existing surfaces have been worked on; such as, items removed, "demoed", modified in any way, added to, patched, etc. Paint entire surfaces from ceiling to base/floor and from one termination of wall surface to another. Terminating painting at door or openings in the walls will not be acceptable unless openings extend from floor to the ceiling or door head or transom panel abut the ceiling.

C. "Paint" as used herein, means all coating systems materials including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate, or finish coats.

D. Work Not To Be Painted: In general, the following items will not require finishing unless specifically specified, scheduled or indicated.

1. Do not include painting when factory-finishing or installer-finishing is specified for such items as, but not limited to, metal toilet enclosures; acoustic materials; modular laminate plastic casework; finished mechanical and electrical equipment including light fixtures, switch gear and distribution cabinets; elevator frames, doors and equipment.

2. Anodized aluminum, stainless steel, chromium plate, brass, bronze and similar finished materials.

3. Do not paint moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts.

4. Do not paint over code-required labels, such as: Underwriters' Laboratories and Factory Mutual, or equipment identification, performance rating, name, or nomenclature plates.

5. Concealed Surfaces: Painting is not required on wall or ceiling surfaces in concealed areas and inaccessible areas such as furred areas, pipe spaces, duct shafts and elevator shafts, as applicable to this project. Paint all exposed piping, equipment, and other such items as required.

6. Finish hardware, except prime-coated items.

7. Walking surfaces.

E. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, miscellaneous metal, hollow metal work, and similar items. Also, for shop-fabricated or factory-built mechanical and electrical equipment or accessories.

1.03 SUBMITTALS

Comply with pertinent provisions of Section 01300.

A. Product Data: Submit manufacturer's technical information including manufacturers name, product number, paint label analysis and application instructions for each material proposed for use.

B. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's).

C. Samples: Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish samples.

1. Provide three 8-1/2" X 11" painted samples of each color and material with texture to simulate actual conditions. Resubmit samples as requested by Architect until acceptable sheen, color, and texture is achieved.

2. On actual wood surfaces, provide two 4" X 8" samples of natural and stained wood finish. Label and identify each as to location and application.

3. Do not proceed with painting work until color samples have been accepted.

1.04 QUALITY ASSURANCE

A. Codes and Standards: Conform work and materials to regulations of State Fire Marshal, Safety Color Coding in conformance with OSHA, and all local State Ordinances, having jurisdiction. Conform to the most stringent requirements and authorities having jurisdiction.

1. Conform to the requirements of the California Air Resources Board (CARB) and all materials shall conform to APCD requirements.

B. Quality Standards: Materials or products specified herein by trade name shall be provided as specified. References to brand names shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. Brand names where used in specifications, shall be presumed to be followed by words "or products of equal or superior quality". Submittal approval will be granted only as set forth in the contract documents and with certification that materials submitted are equal or superior to brand named in specifications in construction, efficiency and utility. All painted surfaces shall be free from any bubbling or peeling for a minimum of three years or shall be re-painted where defective at no cost to owner.

1. Submittals for approval as equal shall include manufacturer's product data sheet for each product indicating composition and percent by weight.

1.05 DELIVERY AND STORAGE

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

1. Name of title of material.

2. Fed. Spec. number, if applicable.

3. Manufacturer's stock number and date of manufacturer.

4. Manufacturer's name.

5. Contents by volume, for major pigment and vehicle constituents.

6. Thinning instructions.

7. Application instructions.

8. Color name and number.

B. Storage: Store paint materials in a single suitable place in compliance with health and fire regulations. Material shall be stacked no more than 3 high in 5 gallon cans, and put in a designated area. Keep such storage place neat and clean. All damage to storage area or to its surroundings shall be cleaned, repaired and refinished and otherwise made good to satisfaction of District. Remove oily rags, waste and the like from building each night and take every precaution to avoid danger of fire.

1.06 JOB CONDITIONS

A. Apply water-base paints and solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are within the range permitted by paint manufacturer's printed instructions.

B. Do not apply paint in rain, fog or mist; or when relative humidity exceeds 85%; or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.

C. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

D. Painting Work by Other Trades: Examine drawings and specifications, including requirements specified in other sections for painting work by other trades. Notify Architect in writing of any conflict between work of this section and that of other trades and sections, and any errors, omissions or impractical requirements. All surfaces that are left unfinished by the requirements of their specification shall be painted or finished as specified as work of this section.

2.00 PRODUCTS

2.01 MATERIAL QUALITY

A. Provide best quality grade of various types of coating as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as standard, best-grade product will not be acceptable.

B. Unless otherwise specified or approved, use paint products of one manufacturer. Oils, thinners, dryers, primers and catalysts shall be approved for use by manufacturer of paint.

C. Provide paints of durable and washable quality. Do not use paint materials which will not withstand normal washing as required to remove pencil marks, ink, etc., without showing discoloration, loss of gloss, staining, or other damage.

2.02 MANUFACTURERS

A. Manufacturers' catalog names and numbers are used to aid in establishing kind and quality of material required and are not used as an indication of color desired.

B. Opaque Paint Finish Materials: Systems specified herein, are products of the Dunn Edwards Corporation. Equivalent opaque finish products by the following will be acceptable, as approved per equivalency chart prepared by Dunn Edwards Corporation. All other manufacturers must submit paint specifications and must be approved by the Architect a minimum of 21 days prior to the bid due date.

Pratt & Lambert
Benjamin Moore

2.03 COLORS AND FINISHES

A. Surface treatments and finishes are shown on drawings and indicated in "schedules" on drawings. Paint colors shall match existing wherever adjoining existing painted surfaces and as approved by the Architect.

B. In locations where new paint is required, the Architect will furnish sample color chips for surfaces to be painted. Match colors of sample chips and submit samples, as specified herein, before proceeding with work. Colors shall normally be from the standard color chart of Evr-gard coatings. Paint shall be custom mixed as necessary, paint which does not match these standard colors exactly will not be accepted.

C. Paint Coordination: Provide finish coats which are compatible with the prime paints used or with existing paint. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coating system for the various substrates. Upon requests from other subcontractors, furnish information on characteristics of specified finish materials, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or existing paints or remove and reprime as required. Notify Architect in writing of anticipated problems using specified coating systems with substrates primed by others.

3.00 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which painting will be performed for compliance with requirements for application of paint. Do not begin paint application until unsatisfactory conditions have been corrected.

B. Starting of painting will be construed as acceptance of surfaces and conditions within a particular area.

3.02 SURFACE PREPARATION

A. Perform preparation and cleaning procedures following paint manufacturer's instructions and as specified, for each particular substrate condition.

B. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so contaminants from cleaning process will not fall onto wet, newly painted surface.

C. Remove hardware, hardware accessories, switch and receptacle plates, surface-mounted lighting fixtures, finish frames of recessed lighting fixture, escutcheons and plats, surface-mounted equipment, free-standing equipment blocking access to painted surfaces, grilles and louvers at ducts opening into finished specs, and other items as required prior to surface preparation and painting operations. Following completion of painting of each space or area, re-install removed items.

D. Wood: All surfaces shall be clean and dry. Sandpaper wood, (except saw-textured wood, if any), smooth to provide an even surface and then dust off and wipe clean. Touch up all knots and pitch pockets with shellac on interior wood and with outside sealer on exterior work. After priming coat has been applied, thoroughly fill all nail holes, irregularities and cracks; use plastic wood filler for stained or natural finish and putty for painted work.

E. Plaster Surfaces: Fill all holes, cracks and abrasions with plaster patching compound, properly prepared, applied and smoothed off to match adjoining surfaces. Plaster surfaces that are to receive enamel finishes shall be allowed to cure for a least three weeks. Do not apply enamel systems to plaster when moisture content exceeds 8 % to 10% as determined by the moisture register meter manufactured by The Moisture Register Co., Alhambra, California.

F. Uncoated Steel and Iron: Acid wash all surfaces with to remove any dirt or grease before applying paint. Where rust ore scale is present, it shall be wire brushed and sandpapered clean. Clean field welds and braided portions of field welded and erected ferrous metal components.

G. Shop Coated Metal Work: Thoroughly clean off all oil, grease, dirt and foreign matter. Spot prime field connections, welds, soldered joints, and burned and braided portions. Factory finished surfaces indicated to be repainted shall be sanded or etched to increase adherence of finish coats.

H. Concrete and Masonry: Properly prepare surfaces where efflorescence exists with approved acid base wash. Fill minor surface defects and cracks with a mixture of acrylic paint and spackling compound.

I. Existing Building Surface Preparation:

1. Metal Surfaces: If existing finish is sound and shows only normal chalking, sand lightly and dust. Wherever existing finish is badly checked, cracked, alligatored, peeling or in general poor condition, completely remove existing finish by liquid remover, water blasting, grinding, sanding or light sandblasting to a sound substrate.

2. Concrete: Sound but chalky; use approved surface conditioner. Light chalky; scrub with stiff fiber brush. Heavy chalked, blistered, alligatored, cracked, loose, or

scaling; high pressure water blast or sandblast clean. Fill all minor cracks. Loose or defective concrete shall be replaced with L.M. Scofield Co., “Speed Crete,” or approved equal.

3. Plaster: Clean by power washing with mild alkali and rinse thoroughly. Remove all loose, blistered or otherwise defective paint, smooth and feather edges by sanding. Plaster on which existing paint is loose, peeling, shows poor adhesion, checking, or is otherwise unsuitable for painting is to be stripped to bare plaster. Cut out and fill all plaster cracks with elastomeric plaster patching compound. Spot prime all plaster patches.

4. Wood: Remove all loose, peeling, or scaly paint, dirt, and other surface contaminants from wood. Feather all edges, and spot prime with multi-purpose exterior wood primer as necessary.

5. Concrete Block: All surfaces must be power washed removing all dirt, loose paint and foreign matter leaving only tightly adhering coatings with tapered edges. Patch all cracks or damaged areas and prime. Prime all bare block.

6. Drywall: Clean surface to remove all dirt, loose paint and foreign matter leaving only tightly adhering coatings with tapered edges. Patch all cracks or damaged areas.

3.03 MATERIAL PREPARATION

A. Mix and prepare painting materials following manufacturer’s directions.

B. Store materials not in actual use in tightly covered containers.

C. Stir materials before application to produce a mixture of uniform density, stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

D. Use only thinners approved by paint manufacturer, and only within recommended limits.

3.04 APPLICATION

A. Apply paint following manufacturer’s directions. Use applicators and techniques best suited for substrate and type of material being applied.

B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, and conditions otherwise detrimental to formation of a durable paint file.

C. Apply paint to clean, dry, prepared surfaces only. Apply all paint material evenly, smoothly flowed on without runs or sags.

D. Provide finish coats compatible with primers used.

E. Minimum Coating Thickness: Apply each material at not less than manufacturer’s recommended spreading rate, to provide a total dry film thickness of not less than 5.0 mils for the entire coating system of prime and finish coats for 3-coat work. Provide a total dry film thickness of not less than 3.5 mils for the entire coating system of prime and finish coat for 2-coat work.

F. The number of coats and film thickness required is the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended

by the manufacturer. Sand between applications where sanding is required to produce an even smooth surface following manufacturer's directions.

G. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.

H. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.

I. Included Work: Finish tops, bottoms, and edges of doors, same as balance of door, after door has been fitted by Carpenter. Where doors open into rooms or spaces having different finishes, communicating doors shall have edges finished as directed. Where walls are specified to be painted, include all columns, arises, reveals, soffits, returns, and the like.

J. Priming: Where shop coats and touch-up painting are specified under other sections of the work, omit prime coat. Prime all ungalvanized ferrous metals. Prime all doors requiring paint, as soon as possible after delivery to job. Prime all edges created by louver and glazing cut-outs.

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

3.05 SPECIAL INSPECTION

A. In addition to any inspection and corrections made by District representatives, for all applications over 5000 square feet, a representative of the paint manufacturer shall inspect all surfaces after they have been prepared for painting and again after surfaces have been primed. They shall certify in writing that the substrate is suitably prepared and primed for the paint being applied. A representative shall also inspect the final application and shall again certify in writing that it has been applied in accordance with the manufacturer's recommendations. Painting contractor shall perform all additional work required to obtain certification of the manufacturer including additional preparation work and/or re-painting of defective workmanship.

3.06 CLEANING AND PROTECTION

A. Cleanup: At the end of each workday, remove empty can, rags, rubbish, and other discarded paint materials from the site.

B. Protection: Protect work of other trades, whether to be painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing and repainting as acceptable to Architect.

C. Provide "Wet Paint" signs and barricades to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

D. At completion of work of other trades, touch-up and restore damaged and defaced painted surfaces.

E. Provide owner with a minimum of 10 gallons of each exact color and type of paint in unopened containers. Owner will not allow opened containers to be left on site, dispose of all opened paint containers off site legally.

3.07 PAINT SYSTEM SCHEDULE

A. Provide following paint systems for substrates indicated.

B. Exterior Surfaces:

1. FERROUS METAL, Structural Steel, (Shop Prime Only)

   1ST COAT: CARBOLINE Carbozinc Zinc Epoxy Primer (859)

2. FERROUS METAL, Structural Steel, (Field Application over factory primer) Concealed Areas

   SPOT PRIME: CARBOLINE Carbozinc Zinc Epoxy Primer (859 VOC)
   (Weld and bolted areas)
   1st COAT: CARBOLINE Carboguard Epoxy Primer (890 VOC)

3. FERROUS METAL, Structural Steel, (Field Application over factory primer) All exposed to view areas

   SPOT PRIME: CARBOLINE Carbozinc Zinc Epoxy Primer (859 VOC)
   (Weld and bolted areas)
   1ST COAT: CARBOLINE Carboguard Epoxy Primer (890 VOC)
   2ND COAT: CARBOLINE Carbothane Acrylic Polyurethane Semi Gloss 133MC
   3RD COAT: CARBOLINE Carbothane Acrylic Polyurethane Semi Gloss 133MC

4. FERROUS METAL, Metal Stairs, (Field Application over factory primer)

   SPOT PRIME: CARBOLINE Carbozinc Zinc Epoxy Primer (859 VOC)
   (Weld and bolted areas)
   1ST COAT: CARBOLINE Carboguard Epoxy Primer (890 VOC)
   2ND COAT: EVERSHIELD, Exterior Semi-Gloss Paint (EVSH50)
   3RD COAT: EVERSHIELD, Exterior Semi-Gloss Paint (EVSH50)

5. FERROUS METAL, Metal Louvers,

   1ST COAT: GALV-ALUM Epoxy Metal Primer (GAPR00)
   2ND COAT: EVERSHIELD, Exterior Semi Gloss Paint (EVSH50)
   3RD COAT: EVERSHIELD, Exterior Semi Gloss Paint (EVSH50)

6. FERROUS METAL, Hollow Metal Doors and Frames,

   1ST COAT: GALV-ALUM Epoxy Metal Primer (GAPR00)
   2ND COAT: EVERSHIELD, Exterior Semi-Gloss Paint (EVSH50)
   3RD COAT: EVERSHIELD, Exterior Semi-Gloss Paint (EVSH50)

7. GALVANIZED METAL, Sheet Metal Flashing,

   PRETREATMENT: SUPREME CHIEMICAL Metal Etch and Cleaner SC ME-01

1ST COAT: GALV-ALUM Epoxy Metal Primer (GAPR00)
2ND COAT: EVERSHIELD, Exterior Semi-Gloss Paint (EVSH50)
3rd COAT: EVERSHIELD, Exterior Semi-Gloss Paint (EVSH50)

8. STUCCO,

1ST COAT: EFF-STOP, Masonry Primer (ESPR00)
2RD COAT: EVERSHIELD, Exterior Semi-Gloss Paint (EVSH50)
3RD COAT: EVERSHIELD, Exterior Semi-Gloss Paint (EVSH50)

C. INTERIOR SYSTEMS:

1 CMU, Eggshell,

1ST COAT: EFF-STOP Masonry Sealer (ESPR00)
2nd COAT: Suprema Interior Eggshell Paint (SPMA30)
3rd COAT: Suprema Interior Eggshell Paint (SPMA30)

2. GALVANIZED METAL, Ceiling Deck, Electrical Conduit, Etc.

1ST COAT: AQUAFALL Latex Dryfall Eggshell
2ND COAT: AQUAFALL Latex Dryfall Eggshell

3. DRYWALL: Shower Stall Ceilings,

1ST COAT: RUSTOLEUM Sierra Grip Tec Primer S-30
2ND COAT: RUSTOLEUM Sierra W/B Epoxy Gloss S-60
3rd COAT: RUSTOLEUM Sierra W/B Epoxy Gloss S-60

4. DRYWALL: Eggshell

1ST COAT: VINYLASTIC Interior Wall Sealer (VNPR00)
2ND COAT: SUPREMA Interior Eggshell Paint (SPMA30)
3RD COAT: SUPREMA Interior Eggshell Paint (SPMA30)

5. WOOD: Semi Transparent Stain

1st COAT: ZENITH W/B Semi Transparent Stain
2nd COAT: DEFT W/B Polyurethane Satin
3rd COAT: DEFT W/B Polyurethane Satin
4th COAT: DEFT W/B Polyurethane Satin

END OF SECTION

SECTION 09 94 00
FLUOROCARBON RESIN COATING

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Principal Work in this Section:

1. This Section contains general specifications pertaining to fluorocarbon resin coating to be applied on specified metal surfaces.

B. Related Work:

1. All other painting and shop priming.

1.03 SUBMITTALS

A. Procedure: In accordance with Section 01300.

B. Certification: Letter from the coating formulator to verify his acceptance of the applicator.

C. Data: Paint manufacturer's published literature.

D. Reports: Test reports indicating compliance of finish with the requirements specified in Article 2.01 on samples selected at random from production runs. During production, test on a daily basis on each shift for compliance with Article 2.01 herein, as verified by testing in compliance with applicable standards.

E. Samples: As specified.

1.04 QUALITY ASSURANCE

A. Applicator's Qualifications: Licensed by the coating formulator.

B. Quality Control Program:

1. Establish and submit for approval a quality control program to assure compliance with the specified requirements.
2. The program shall include documented procedures, processes, etc.

3. Maintain complete certified inspection, testing and process records of finishing procedures. These records shall be available to the Architect upon request.

4. Do not start application prior to approval of the quality control program.

1.05 HANDLING

A. Procedure: In accordance with Section 01600.

B. Limitations: Do not ship to the job site materials that have not been inspected, tested and marked in the prescribed manner, does not fall within the prescribed color range, or have been rejected by the Architect.

1.06 WARRANTY

A. The fluorocarbon resin coating is included in the general warranty.

B. In addition, submit a written warranty specifically covering film integrity (5 years minimum), fade resistance as defined by ASTM D 2244 (state maximum deviation in 5 years), and chalk resistance as defined by ASTM D 659 (state maximum deviation in 5 years).

2.00 PRODUCTS

2.01 FORMULATOR/ MATERIALS

A. Resin Base Manufacturer: Kynar 500 by Atochem North America, or Hylar 5000 by Ausimont USA, Inc.

B. Coating Manufacturer: PPG Industries, Inc. (Duranar), Morton International, Inc. (Fluoroceram), Valspar Corp. (Fluropon), Lilly Industries, Inc. Nubelar), and Keeler & Long, Inc.

C. Pretreatment:

1. Shall meet ASTM D 1730, Type B, Method 5 or Method 7.
2. Processing shall conform with ASTM B 449, Section 5.

3. Conversion coating weight shall be between 30-100 mg/sq. ft.

D. Standard: The finish shall meet or exceed the requirements of AAMA 605.2, Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels, and the following minimum properties.

1. Gloss: Percent reflectivity of approved sample when tested in compliance with ASTM D 523.

2. Pencil Hardness: F minimum with Eagle Turquoise Pencil.

3. Dry Film Thickness:

a. Primer: 0.3, +0.1 mil.

b. Top Coat: Minimum 1 mil.

4. Abrasion Resistance: Coefficient of abrasion of 65 minimum when tested incompliant with ASTM D 968.

5. Solvent Resistance: 100 double MEK rubs minimum.

6. Adhesion: No pick off when tape tested over 1/16 in. crosshatch wet and dry.

7. Salt Spray: ASTM B 117, 5% solution at 100 deg. F. Few scattered blisters no larger than No. 8 according to ASTM 1654 and no more than 1/16 in. creepage from areas scribed to bare metal after 3,000 hours.

8. Humidity Resistance: ASTM D 2247. Few scattered blisters no larger than No. 8, according to ASTM D 714 Figure No. 4 after 3,000 hours.

9. Chalking Resistance: No greater than No. 8 for colors and No. 6 for white based on ASTM D 659 after exposure for 5,000 hours in Sunshine Arc Weatherometer XWR using 60/60 cycle.

10. Color Change: No greater than 5E NBS units, as determined in compliance with ASTM D 244 after removal of external deposits and after exposure for 5,000 hours in Sunshine Arc Weatherometer XWR using 60/60 cycle.

11. Boiling Water: No pick off when tape testing over crosshatched area one hour after immersion in distilled boiling water.

12. Water Immersion: No pick off when tape testing over crosshatched area after immersion in aerated distilled water 80 deg. +10 deg. after 500 hours.

E. Color:

1. It is the intent of these Specifications that the color variation between adjacent parts of the same finish be imperceptible to the naked eye under normal daylight conditions at the Project site.

2. To this end, submit range samples defining the maximum variation of color that can be anticipated. Samples shall be on 12 in. lengths of extrusions, and on 24 in. square sheet/plate/panels.

3. Adjacent pieces and pieces which will be within 6 in. of each other shall not vary in color by more than one-half the accepted range so that the variation is imperceptible to the naked eye under normal daylight conditions.

4. Inspect parts carefully in the shop, grade them for assembly compatibility and mark them for installation location.

5. In the construction of mock-ups, finish the various components to show the maximum variation that will exist in the actual building construction between adjacent and non-adjacent components.

3.00 EXECUTION

3.01 APPLICATION

A. Clean, prepare, pretreat surfaces to be coated, and apply coating in compliance with the coating manufacturer's instructions and these Specifications.

B. Coated surfaces shall be uniform in thickness and color, smooth and free from blemishes in the coating that might impair the serviceability or detract from the general appearance of the member when viewed from 5 ft. away, and shall match the approved samples.

C. Coatings which do not comply with Specification requirements or do not match approved samples shall be stripped and re-coated, or the Contractor shall furnish new material with the required coating.

3.02 TOUCH-UP

A. After erection or installation, touch-up abrasions in the surface coating, using an air-drying fluorocarbon resin finish similar to Megaflon by Keeler & Long, Inc., when the touch-up work is acceptable to the Architect; otherwise strip and recoat the damaged part.

END OF SECTION

SECTION 10 11 00
VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Markerboards.
2. Tackboards.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For visual display surfaces. Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of panel joints.
2. Include sections of typical trim members.
3. Wiring Diagrams: For power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified.

D. Qualification Data: For qualified Installer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for surface-burning characteristics of fabrics.

F. Operation and Maintenance Data: For visual display surfaces to include in maintenance manuals.

G. Warranties: Sample of special warranties.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of motor-operated, sliding visual display units required for this Project.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Preinstallation Conference: Conduct conference at Project site.

1.4 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Surfaces lose original writing and erasing qualities.

b. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period: 50 years from date of Substantial Completion.

3. Warranty Period: Life of the building.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Porcelain-Enamel Face Sheet: ASTM A 424, enameling-grade steel, uncoated thickness indicated; with exposed face and edges coated with primer, 1.7-to-2.5-mil- (0.043-to-0.064-mm-) thick ground coat, and color cover coat; and with concealed face coated with primer and 1.7-to-2.5-mil- (0.043-to-0.064-mm-) thick ground coat.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following: .

a. PolyVision Corporation, a Steelcase company; P^3 ceramicsteel Markerboard.

B. Melamine: Thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

C. High-Pressure Plastic Laminate: NEMA LD 3.

D. Natural Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face sanded for natural finish with surface-burning characteristics indicated.

E. Plastic-Impregnated Cork Sheet: Seamless, homogeneous, self-sealing sheet consisting of granulated cork, linseed oil, resin binders, and dry pigments that are mixed and calendared onto fabric backing; with washable vinyl finish and integral color throughout with surface-burning characteristics indicated.

F. Vinyl Fabric: Mildew resistant, washable, complying with FS CCC-W-408D, Type II, burlap weave ; weighing not less than 13 oz./sq. yd. (440 g/sq. m); with surface-burning characteristics indicated.

G. Polyester Fabric: Nondirectional weave, 100 percent polyester; weighing not less than 15 oz./sq. yd. (508 g/sq. m); with surface-burning characteristics indicated.

H. Hardboard: ANSI A135.4, tempered.

I. Particleboard: ANSI A208.1, Grade M-1, made with binder containing no urea formaldehyde.

J. Fiberboard: ASTM C 208.

K. Extruded Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6063.

2.2 MARKERBOARD ASSEMBLIES

A. Porcelain-Enamel Markerboards: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction consisting of backing sheet, core material, and 0.021-inch- (0.53-mm-) thick, porcelain-enamel face sheet with low-gloss finish.

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

   a. AARCO Products, Inc.

   b. ADP Lemco, Inc.

   c. Aywon.

   d. Bangor Cork Company, Inc.

   e. Best-Rite Manufacturing.

   f. Claridge Products and Equipment, Inc.

   g. Egan Visual Inc.

   h. Ghent Manufacturing, Inc.

   i. Marsh Industries, Inc.; Visual Products Group.

   j. Platinum Visual Systems; a division of ABC School Equipment, Inc.

   k. PolyVision Corporation; a Steelcase company.

   l. Tri-Best Visual Display Products.

2. Hardboard Core: 1/4 inch (6 mm) thick; with 0.015-inch- (0.38-mm-) thick, aluminum sheet backing.

3. Particleboard Core: 1/2 inch (13 mm)] thick; with 0.015-inch- (0.38-mm-) thick, aluminum sheet backing.

4. Fiberboard Core: 1/2 inch (13 mm) thick; with 0.015-inch- (0.38-mm-) thick, aluminum sheet backing.

5. Manufacturer's Standard Core: Minimum 1/4 inch (6 mm) thick, with manufacturer's standard moisture-barrier backing.

6. Laminating Adhesive: Manufacturer's standard, moisture-resistant thermoplastic type.

B. High-Pressure-Laminate Markerboard Assembly: Balanced, high-pressure, factory-laminated chalkboard assembly of three-ply construction consisting of backing sheet, fiberboard core material, and high-pressure-laminate writing surface.

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

a. Best-Rite Manufacturing.

b. EverProducts by Glenroy Inc.

c. Marsh Industries, Inc.; Visual Products Group.

2.3 TACKBOARD ASSEMBLIES

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

1. A-1 Visual Systems.

2. AARCO Products, Inc.

3. ADP Lemco, Inc.

4. Aywon.

5. Bangor Cork Company, Inc.

6. Best-Rite Manufacturing.

7. Claridge Products and Equipment, Inc.

8. Egan Visual Inc.

9. EverProducts by Glenroy Inc.

10. Ghent Manufacturing, Inc.

11. Marsh Industries, Inc.; Visual Products Group.

12. Platinum Visual Systems; a division of ABC School Equipment, Inc.

13. PolyVision Corporation; a Steelcase company.

14. Tri-Best Visual Display Products.

B. Vinyl-Fabric-Faced Tackboard : 1/4-inch- (6-mm-) thick, vinyl-fabric-faced cork sheet factory laminated to 1/4-inch- (6-mm-) thick particleboard backing.

2.4 MARKERBOARD AND TACKBOARD ACCESSORIES

A. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- (1.57-mm-) thick, extruded aluminum; standard size and shape.

1. Field-Applied Trim: Manufacturer's standard, screw-on trim with Phillips flat-head screws.

2. Factory-Applied Trim: Manufacturer's standard.

B. Factory-Applied Wood Trim: Manufacturer's standard species not less than 1/2 inch (13 mm) thick; standard size and shape.

C. Field-Applied Wood Trim: Comply with requirements specified in Division 06 Section Architectural Woodwork.

D. Chalktray: Manufacturer's standard, continuous.

1. Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.

2. Solid Type: Extruded aluminum with ribbed section and smoothly curved exposed ends.

E. Map Rail: Provide the following accessories:

1. Display Rail: Continuous and integral with map rail; fabricated from cork approximately 1 to 2 inches (25 to 50 mm) wide.

2. End Stops: Located at each end of map rail.

3. Map Hooks: Two map hooks for every 48 inches (1219 mm) of map rail or fraction thereof.

4. Map Hooks and Clips: Two Insert number map hooks with flexible metal clips for every 48 inches of map rail or fraction thereof.

5. Flag Holder: One for each room.

6. Paper Holder: Extruded aluminum; designed to hold paper by clamping action.

2.5 FABRICATION

A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.

B. Visual Display Boards: Factory assemble visual display boards unless otherwise indicated.

1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display boards at manufacturer's factory before shipment.

C. Factory-Assembled Visual Display Units: Coordinate factory-assembled units with trim and accessories indicated. Join parts with a neat, precision fit.

1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints as indicated on approved Shop Drawings.

2. Provide manufacturer's standard vertical-joint spline system between abutting sections of markerboards.

3. Provide manufacturer's standard mullion trim at joints between markerboards and Tackboards of combination units.

4. Where size of visual display boards or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Architect from manufacturer's standard structural support accessories to suit conditions indicated.

D. Modular Visual Display Boards: Fabricated with integral panel clips attached to core material.

E. Aluminum Frames: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to a neat, hairline closure.

1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display units at manufacturer's factory before shipment.

2.6 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm).

2.7 VISUAL DISPLAY SURFACE SCHEDULE

A. Visual Display Board Factory assembled.

1. Markerboard: Porcelain-enamel markerboard assembly.

a. Color: As selected by Architect from full range of industry colors.

2. Corners: Rounded.

3. Width: 8’-0”

4. Height: 4’-0”.

5. Mounting: [Wall] [Rail support system].

6. Mounting Height: As indicated on Drawings

7. Factory Applied Aluminum Trim: Manufacturer's standard with clear anodic finish.

a. Color: As selected by Architect from full range of industry colors and color densities.

8. Accessories:

a. Chalktray: Box type.

B. Tackboard Factory assembled.

1. Tack Surface: Vinyl-fabric-faced tackboard assembly.

   a. Color: As selected by Architect from full range of industry colors.

2. Corners: Rounded.

3. Width: As indicated on Drawings

4. Height: As indicated on Drawings

5. Mounting: Wall

6. Mounting Height: As indicated on Drawings

7. Edges: Concealed by trim

   a. Factory Applied Aluminum Trim: Manufacturer's standard, with clear anodic finish.

      1) Color: As selected by Architect from full range of industry colors and color densities.

C. Sliding Visual Display Unit

1. Vertical-Sliding Type: Two track unit with tubular frame on four sides.

   a. Fixed Rear Panel: Porcelain-enamel assembly.

      1) Color: As selected by Architect from full range of industry colors].

   b. Fixed Rear Panel: Porcelain-enamel markerboard assembly.

      1) Color: As selected by Architect from full range of industry colors.

   c. Sliding Panels: Porcelain-enamel markerboard assembly.

      1) Color: As selected by Architect from full range of industry colors.

2. Overall Width: As indicated on Drawings

3. Overall Height: As indicated on Drawings

4. Mounting Height: As indicated on Drawings

5. Factory Applied Aluminum Trim: Manufacturer's standard

   a. Finish: Clear anodic

6. Accessories: Chalktray

7. Inside Surface of Doors: Porcelain-enamel] markerboard assembly, color to match fixed rear panel.

8. Corners: Rounded.

9. Width: As indicated on Drawings

10. Height: As indicated on Drawings

11. Mounting Height: As indicated on Drawings

12. Accessories: Cylinder lock .

PART 3 - EXECUTION

3.1 INSTALLATION

A. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display surfaces and wall surfaces.

B. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

C. Field-Assembled Visual Display Units: Coordinate field-assembled units with grounds, trim, and accessories indicated. Join parts with a neat, precision fit.

1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, as indicated on approved Shop Drawings.
2. Provide manufacturer's standard vertical-joint spline system between abutting sections of].

D. Visual Display Boards: Attach visual display boards to wall surfaces with egg-size adhesive gobs at 16 inches (400 mm) o.c., horizontally and vertically.

E. Visual Display Boards: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 16 inches (400 mm) o.c. Secure both top and bottom of boards to walls.

1. Field-Applied Aluminum Trim: Attach trim over edges of visual display boards and conceal grounds and clips. Attach trim to boards with fasteners at not more than 24 inches (610 mm) o.c.

a. Attach chalktrays to boards with fasteners at not more than 12 inches (300 mm) o.c.

F. Sliding Visual Display Units: Install units in recessed locations and at mounting heights indicated. Attach to wall framing with fasteners at not more than 16 inches (400 mm) o.c.

1. Adjust panels to operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

G. Visual Display Conference Units: Install units in locations and at mounting heights indicated on Drawings, or if not indicated, at height indicated below. Attach to wall surface with concealed brackets screwed to wall.

1. Mounting Height: 72 inches (1829 mm) above finished floor to top of cabinet.

H. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room. Cover and protect visual display surfaces.

END OF SECTION

SECTION 10 12 00
TACKABLE VINYL PANELS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

1. Tackable vinyl panels.

2. Supplementary parts and components, such as inserts, clips, fasteners, anchors, and other miscellaneous supports and accessories required for a complete installation.

1.03 SUBMITTALS

A. Procedure: In accordance with Section 01300.

B. Data: Manufacturer's data for item specified.

C. Shop drawings: Show attachment to adjacent construction, location of top of panels in relationship to new ceiling height and cut-outs for existing and new electrical outlets and other items to be surface-mounted over finished panels.

D. Samples: 24 in. square, complete, framed.

E. Closeout: Copies of the manufacturers' recommended maintenance products, and maintenance methods.

1.04 HANDLING

A. Procedure: In accordance with Section 01600.

2.00 PRODUCTS

2.01 MATERIALS

A. Core: 1/2 in. thick NCFR Homasote by Homasote Co., UL labeled with a flame spread (primed) and smoke developed of 20, in largest sizes available to fit the conditions shown with minimum number of joints.

1. 1/2” fiberboard (NACO or CELOTEX) acceptable alternates

B. Vinyl Fabric Manufacturers: Forbco Vicrtex Inc. Wallcovering, Classic Vinyl’s Intek Sensa, Galaxy, Eclipse or approved equal. Color to be selected by Architect.

C. Trim: Clear anodized extruded aluminum at bottom and exposed sides.

D. Fasteners: Concealed, structural adhesive by 3M.

2.02 FABRICATION

A. Fabricate panels in largest available size, with square corners, and joints in locations approved by Architect. Use continuous panels wherever possible.

B. Where penetrations occur, make accurate openings and securely return fabric under openings, with no visible fabric edges or fraying on panel surface.

C. Laminate fabric facing to core; adhesive may be used at the Contractor's option but shall not change the flame spread nor smoke developed ratings. Wrap all board edges and conceal fabric edges on back side of each panel.

D. Eliminate air pockets between vinyl covering and backing surface.

E. Vinyl covering shall be secure, smooth, clean, without wrinkles, bubbles, gaps, overlaps, tears or other imperfections.

3.00 EXECUTION

3.01 INSPECTION

A. Verify conditions and measurements affecting the work of this Section at site. Make sure that detrimental conditions are corrected before proceeding with installation.

3.02 INSTALLATION

A. Install panels in compliance with their manufacturer's printed instructions and the Drawings. Coordinate the installations with related trades.

B. Install top and bottom channels level and mechanically attach to studs or blocking. Start bottom channel above the base.

C. Set panels securely, plumb, level and square with flush, hairline joints between adjacent panels. Secure to walls with daubs of compatible adhesives spaced at 12 in. o.c. each way. Hold panels in place until adhesive sets.

D. Install existing and new electrical outlets and other items to be surface-mounted over finished panels so that openings are completely covered, leaving no visible gaps or raw fabric edges.

E. Clean and replace damaged components at no additional cost to the District.

END OF SECTION

IDENTIFYING DEVICES
SECTION 10 14 00

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Plastic signs.

a. ISA sign
b. Room Number and Name Sign
c. Occupancy Sign
d. Exit Sign
e. Accessible Restroom Signage

B. Related Work:

1. Lighted Exit Signs: Division 26.

1.03 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies and Codes:

1. State Fire Marshal, Title 19.

2. California Building Code (CBC) and Standards.

3. Federal Americans with Disabilities Act (ADA) and to State "Accessibility" Regulations.

B. Text, Numbering and Message: The District will provide exact numbering and wording for signs.

1.04 SUBMITTALS

A. Procedure: In accordance with Division 01.

B. Samples:

1. Two (2) for Each Type, Including the following:

a. Manufacturer’s standard color range.

b. One (1) of each typical sign specified.

C. Product Data: Manufacturer's standard brochures describing all items and materials; specific items for this work shall be indicated / highlighted.

D. Shop Drawings: Signs, 4 copies, all work, including fastening devices and backing plates.

2.00 PRODUCTS

2.01 MANUFACTURERS/MATERIALS

A. All other Plastic and Metal Signs:

B. Acceptable Manufacturers / Products: Mohawk Sign Systems (518) 370-3433) Series No. 200-A, or equal.

C. Description of System: Text, letters, symbols and Braille must be integral.

D. List of Signs: Note that all signs specified below may not be required for the Project. Refer to the Drawings and provide all required signage for the Project.

E. Unframed Plastic Signs:

1. Plastic – ES Plastic: Two-color sandwich with face color contrasting with core color suitable for interior and exterior use.

2. Text / Letters / Symbols / Braille:

a. Raised in accordance with ADA and CBC requirements.

b. Color contrasting with their background color. 70% minimum contrast and have a non-glare finish.

c. Created by sandblasting away the face color to expose the surrounding background (core) color.

d. Contracted Grade 2 Braille shall be used whenever Braille symbols are specifically required. Dots shall be spaced 1/10 inch (2.54 mm) on center within each cell with 2/10 inch (5.08 mm) space between cells. Domed Dot shall be raised 1/40 inch (0.635 mm) above background. Refer to CBC Sections 11B-703.3 and 11B703.4. All signage shall conform to CBC Sections 11B-703

e. Gluing components of signs together is not acceptable.

3. Type Style: “Helvetica Medium” all upper case, 3/4 in. high (72-point). Characters on signs shall be raised 1/32” (0.794 mm) minimum and shall be sans serif uppercase characters accompanied by Grade 2 Braille.

4. Arrangement: Standard spacing between letters, words, numbers and lines; centered typically; 1/2 in. minimum margins.

5. Edges and Corners: Finish edges smooth; 1/2 in. rounded corners. Provide screw mounting hole at each corner.

6. Colors: As selected by the Architect. Contrast between character, symbols and their background must be 70% minimum and have a non-glare finish, per 11B-703.5.1.

7. Sign Face Colors, and Core Colors: One face/core color combination for each site will be selected by Architect from manufacturer's standard color ranges (12 colors minimum).

8. Code Required Colors: Where colors are mandated by Codes or regulations, conform to those requirements. Accessibility signage shall be blue color equal to #15090 per Federal Standard 595B. All other colors will be selected by Architect.

9. Color Type: Integral to sign material; painting is not acceptable.

10. Mounting: Non-corrosive vandal-resistant screws and double-face, pressure-sensitive foam tape, full length and width of sign.

11. Letters and numbers on signs: Proportion for raised characters on signs shall be selected from fonts where the width of the uppercase letter "O" is 60% minimum and 100% maximum height of the uppercase letter "I". Stroke thickness of the uppercase letter "I" shall be 15% maximum of the height of the character.

F. Room Number Signs:

1. Size: 8 in. high by 9 in. long, with 3 numbers.

2 Wording: Varies from sign to sign, but signs will average 12 letters.

3 Arrange words in a single line of text where possible within the limitations imposed for number of characters for each line. Use additional lines where necessary to accommodate longer tests. Do not hyphenate words.

G. Typical Sizes: Signs shall be modular. Use combinations of the following height and width dimensions as necessary to suit the wording for each particular type.

1. Heights:

a. For 1 line of text: 6 in.

b. For 2 lines of text: 6 in.

c. For 3 lines of text: 6 in.

NOTE: With corresponding Braille.

2. Length - Characters for Each Line of Text:

a. 10 characters or less: 9 in.

b. 16 characters maximum: 13 in.

H. Building Entrance Signs:

1. Size: 6 in. by 6 in., typically.

2. International accessible/Wheelchair symbol (ISA sign).

3. Refer to the Drawings.

I. Exit / Exit Route signs

1. 6 in. x 6 in., typical

2. Refer to drawings

J. Plastic Accessible Symbol Signs:

1. Figure / Symbol Style: Recognized standard “International Symbols of Accessibility” such as those developed by the American Institute of Graphics for the US Dept. of Transportation.

2. Types:

a. Toilet Room Door Signs: Appropriate Man/Boy or Woman/Girl silhouette figures, superimposed over geometric symbols.

1) Color: White figure on blue geometric symbol.

2) Geometric Symbols:

a) For Men: Equilateral triangle, 12 in/ on a side by 1/4 in. thick.

b) For Women: 12 in. diameter circle by 1/4 in. thick.

K. Occupancy Capacity Signage:

1. Sign Size: Typically 6 in. high by 10 in. long, except as indicated.

2. See 1/8 in. scale “Floor Plan” sheets / Drawings for sign location.

3. Wording for Typical Signs. “CAPACITY OF THIS ROOM LIMITED TO _____PERSONS”

Note: See “Building Code Analysis” plan sheets for the (Number) of persons to be inserted for each sign.

3.00 EXECUTION

3.01 PREPARATION

A. Layout: Accurately lay out work to maintain proper lines, levels and spacing.

3.02 INSTALLATION - PLASTIC SIGNS

A. General: Press tape firmly to mounting surface, and secure each sign with 4 vandal-resistant screws, one screw at each corner, equidistant from the edges.

B. Mounting Location:

1. General:

a. At heights and locations prescribed by Code.

b. As indicated on Drawings.

c. Multiple Signs: Where more than one sign occurs in one area, group signs vertically, one above the other with 1/4 in. space between signs; field verify with Architect before installation.

2. Mount the Following Signs on Walls:

a. Typical Signs: Room name signs and room number signs at 60 in. above finished floor and as directed by Architect.

b. Building Entrance: Accessible (ISA) figure symbol building entrance sign(s) as indicated on Drawings.

c. Room Capacity Signs: Mount on wall in visible location as directed.

d. Exit Signs.

END OF SECTION

SECTION 10 16 05
SOLID POLYMER TOILET COMPARTMENTS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

A. Solid polymer resin HDPE panels and aluminum hardware as indicated on the drawings and specified herein.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Toilet Room accessories.

B. Supporting construction.

1.04 QUALITY CONTROL

A. Panel Test Requirements:

PROPERTY	VALUE	UNITS	ASTM TEST METHOD
Density	0.96+	g/cc	D-1505
Tensile Yield	4400	psi	D 638
Elongation	600%	%	D 638
Izod Impact	7.0	ft-lb/in of notch	D 256
Tensile Impact	120	ft-lb/in^2	D1822
Brittleness Temperature	- 76	^{o}C	D 746
Hardness	68	Shore D	D2240
Flexural Modulus	220.000psi		D 256
Smoke Density	75		D2843
Self Ignition	700		D1929-77
Rate of Burn	1.29	CM/MIN	D-635-81

1.05 DESIGN

A. Floor mounted, overhead braced, except as noted.

B. Height, dimension to meet manufacturers' standard.

C. Where required, stall door openings shall conform to The California Building Code – (CBC). Except where noted otherwise on drawings, doors to be 3'-0" wide, have slide bolt door latch or "U" shaped wire pulls both sides of door mounted at 30" to 44" above finished floor and coat hooks at 48" above first floor.

D. U shape handle both sides immediately beneath latch.

E. Door hardware shall be mounted at 30" to 44" above finished floor.

F. Doors shall have self-closing continuous hinges.

G. Doors at front entrance stalls shall have 32” minimum clear width when door is opened 90 degrees.

H. Doors at side entry stalls shall have 34” minimum clear width when door is opened 90 degrees.

I. Provide coat hook at each stall at back of door.

J. Provide continuous wall-mounting brackets for all partitions.

1.06 SUBMITTALS

A. Submit the following, in conformance with Division 01.

1. Laboratory results for flammability.

2. Laboratory results for chemical resistance, including sugar solutions.

3. Shop drawings, including precise locations of connections to supporting structure.

4. Color samples for Architects' color selection.

5. Warranty: Ten years.

2.00 MATERIALS

2.01 PANEL

A. Single component solid polymer or high density polyethylene resin casting with integral color extending from surface to surface, including shoes.

B. Manufacturer: Santana Products Inc. <u>There shall be no substitutions</u>.

C. Machined edges - 1/4" minimum radius.

2.02 HARDWARE

A. Partition assembly, bracing, leveling and operating hardware shall be manufacturers heavy duty vandal-proof design.

B. Stainless steel - 304 only. Zmak chrome-plated steel. Aluminum - hard coat anodize-clear.

C. Hardware warranty shall match panels.

3.00 EXECUTION

3.01 INSTALLATION

A. Install work of this Section in conformance with reviewed shop drawings. Finish colors shall conform to selections by the Architect.

B. Panels shall completely fill the space indicated. Panels shall be square, level, and plumb. Joints shall be uniform.

C. Fasteners shall be installed normal to bearing surfaces, in precisely drilled holes.

3.02 APPROVAL

A. Hardware shall be secured to solid blocking.

B. Operating hardware shall control doors in all positions and shall be adjusted for smooth operation.

C. Work of this section shall have complete finishes, free from blemish or discoloration.

END OF SECTION

SECTION 10 20 00
EXTERIOR WALL LOUVERS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

A. Principal work in this Section:

1. Exterior steel wall louvers with bird screens.

2. Supplementary parts and components such as inserts, clips, fasteners, anchors, and other miscellaneous supports and accessories required for a complete installation.

B. Related work:

1. Finish painting louvers: Section 09 90 00.

2. Interior louvers connected to ductwork – see mechanical drawings.

1.03 SUBMITTALS

A. Submit copies of manufacturer's data supplemented by shop drawings showing fabrication and installation details not shown by the manufacturer's data sheets.

B. Include details of sections and connections. Show anchorage and accessories.

1.04 QUALITY ASSURANCE

A. Engineer, design, fabricate and install louver assemblies to resist, without failure and a maximum deflection of 1/240 of the span, a live load of 20 psf.

2.00 PRODUCTS

2.01 MANUFACTURE

A. Description of louvers given hereafter and indicated on the Drawings, to establish a standard of quality, function and design, is for model No. FCB-666 by Airolite Co. Other acceptable manufacturers, whose products may be used only with the Architect's approval in each case, include Construction Specialties, Inc., Air Louvers, and Industrial Louvers Inc.

B. An acceptable alternate to the above is Airolite Co. CB-666 aluminum with a factory applied "Kynar 500" finish. Color to be selected by Architect to match adjacent surface.

2.02 MATERIALS

A. Galvanized sheet steel: ASTM A526 and A527, with ASTM A525, G90 zinc coating, mill phosphatized.

B. Steel reinforcement (where required to meet design criteria): ASTM A36 galvanized to provide a zinc coating equivalent to the sheet steel specified above.

C. Solder: ASTM B32, alloy grade 50A for ferrous metals. Provide proper flux to suit base metal.

D. Fasteners, anchors and inserts: Use non-ferrous metal or hot dip galvanized steel.

E. Metal treat: Vinyl wash primer complying with SSPC-PT 3.

F. Primer: Manufacturer standard rust-inhibitive paint compatible with galvanizing.

G. Bird screen: 1/2" mesh, 0.063" diameter galvanized wire, crimped screen material. See mechanical drawings and specifications.

H. Insect Screen: 18 x 16 size aluminum mesh, set in aluminum frame. See mechanical drawings and specifications.

I. Sealant and back-up: As specified in Section 07920.

2.03 FABRICATION

A. Louvers and frames:

1. Fabricate from minimum 16 gauge galvanized sheet steel.

2. Provide concealed vertical stiffener assemblies of plates, angles, tees or shapes as required for rigidity, welded or fastened to the inside face of each blade. Form ends of blades flat against jamb for fastening.

3. Frame each louver with mitered or coped and continuously welded or riveted and soldered joints. Weld or rivet and solder blades to frames at each end, so that all joints will be watertight. Reinforce frames and blades as required for stiffness.

4. Form blades and frames to the profiles, sizes and spacing shown. Overlap blades and "hook" both edges to prevent blow-through of water. Form frame to provide tolerances for installation, with sealants in joints between louvers and adjoining work.

B. Screens:

1. Provide removable (bird)(insect) screens where indicated. Secure screen in formed galvanized steel frame with a driven spline or insert for securing screen mesh.

2. Locate screen on inside face of louver. Attach to louver frames with machine screws, spaced at each corner and at 12" o.c. between.

C. Provide sill extensions and loose sills made of same material as louvers, where indicated or required for drainage to exterior and to prevent water penetration.

D. Finishing: Clean, treat and paint louvers in the shop. Apply primer to a minimum dry film thickness of 2 mils on all surfaces of the fabricated units, whether exposed or concealed when installed.

3.00 EXECUTION

3.01 INSPECTION

A. Inspect adjacent construction and supports. Make sure that openings are within allowable tolerances, plumb, level, clean, will provide a solid anchoring surface, and that other conditions detrimental to the proper or timely completion of this work are corrected before proceeding with installation.

3.02 INSTALLATION

A. Coordinate setting drawings, diagrams, templates, instructions and directions for the installation of anchors to be embedded in concrete or masonry. Coordinate the delivery of these items to the Project site.

B. Locate and place louvers plumb, level and in proper alignment with adjacent work.

C. Use concealed anchors wherever possible.

D. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers, as shown.

E. Install removable bird screens in louver frames.

F. Repair primer damaged by cutting, welding, soldering and grinding operations required for fitting and jointing. Use same paint as for shop primer.

END OF SECTION

SECTION 10 44 00
FIRE EXTINGUISHERS AND CABINETS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes fire extinguishers; fire extinguisher cabinets; and brackets for wall mounting.

B. Related Sections:

1. Section 07 90 00 – Sealants and Caulking.

2. Section 09 90 00 - Painting: Field applied paint finish.

1.03 REFERENCES

A. ADA - Title III of the American with Disabilities Act, for the Handicapped.

B. CAR - The California Accessibility Regulations, Part 2,
Title 24 of the California Building Code, 1998 California Building Code with State Amendments.

C. NFPA 10 - Standard for Portable Fire Extinguishers.

D. UL - Fire Protection Equipment Directory.

1.04 SUBMITTALS FOR REVIEW

A. Submit under provisions of Section 01340 – Shop Drawings and Samples.

B. Shop Drawings: Indicate physical dimensions of cabinet and adjacent plate, rough-in details, measurements for
mounting, attachment methods, and hardware. Show relationship to existing wall opening.

C. Product Data: Provide extinguisher operational features,color, finish and anchorage.

1.05 CLOSEOUT SUBMITTALS

A. Section 01700 – Contract Closeout: Closeout procedures.

B. Operation and Maintenance Data: Submit test, refill or recharge schedules and re-certification requirements.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 - Product Handling: Environmental conditions affecting products on site.

B. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

1.07 REGULATORY REQUIREMENTS

A. Conform to the more restrictive provisions of Title III of the American with Disabilities Act or the California Accessibility Regulation, Part 2, Title 24 of the 1998 California Building Code with State Amendments.

B. Conform to Title 19, CCR Chapter 3.

C. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

2.00 PRODUCTS

2.01 FIRE EXTINGUISHERS

A. Manufacturers:

1. J. L Industries

2. Kidde Fire Extinguisher CO.

3. Larsen's Manufacturing Co.

4. Substitutions: Under provisions of Section 01630 Substitutions.

B. Fire Extinguishers: Multipurpose dry chemical type, 5 lbs. Nominal capacity, UL-rated 2A:10-BC, in cast steel container in classrooms, offices, and multipurpose rooms. Model shall be cosmic by J.L. Industries or accepted substitution.

C. Extinguisher Finish: Stainless steel tank.

2.02 FIRE EXTINGUISHER CABINETS

A. Cabinet shall be Academy 2025 by J.L. Industries or accepted substitution.

B. Metal: #180 aluminum, clear anodized.

C. Configuration: recessed type, sized to accommodate accessories.

D. Trim Type: Flat trim.

E. Door: 18 gauge thick, reinforced for flatness and rigidity; lock with break glass access.

F. Door Glazing: 1/4 inch thick plate.

G. Must comply with CBC Sections 1117B.6 and 1118B.

3.00 EXECUTION

3.01 EXAMINATION

A. Verification of existing conditions before starting work.

B. Verify size and condition of opening in CMU walls.

3.02 INSTALLATION

A. Fabricate and coordinate the assembly of cabinet and adjacent plate so that installation into wall opening is provided.

B. Provide one (1) hour fire rated wall assembly at back side of existing wall opening.

C. Install in accordance with manufacturer's instructions.

D. Install brackets plumb and level on wall, height from finished floor as indicated on drawings conforming to California Building Code.

E. Secure rigidly in place.

F. Place extinguishers and accessories in cabinets.

END OF SECTION

SECTION 10 51 00
HDPE LOCKERS AND LOCKER ROOM BENCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid plastic lockers.
2. Locker benches.

B. Related Sections:

1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:

1. Shop Drawings: Include dimensioned layout, elevations, trim, closures, and accessories.
2. Product Data: Manufacturer's descriptive data.
3. Samples: 3 in x 3 in samples showing all available colors.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 years of experience in manufacture of solid plastic lockers with products in satisfactory use under similar service conditions.

B. Installer Qualifications: Minimum 5 years of experience in work of this Section.

1.4 WARRANTIES

A. Provide manufacturer’s 25 year warranty against breakage, corrosion, and delamination under normal conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Contract Documents are based on Duralife products by Scranton Products. (www.scrantonproducts.com). Products by other manufacturers may be approved provided they meet the detailed specifications written below. Approval procedure shall be as specified in the General Conditions of these locker specifications.

2.2 MATERIALS

A. Solid Plastic Panels:

1. Lockers:

a. High impact, high density polyethylene (HDPE) formed under high pressure into solid plastic components with homogeneous color throughout, with smooth orange peel finish.

b. Edges machined to accept assembly brackets.

2. Locker benches:

   a. High density polyethylene (HDPE), fabricated from polymer resins compounded under high pressure, forming single thickness panel.

   b. Waterproof and nonabsorbent, with self-lubricating surface, resistant to marks by pens, pencils, markers, and other writing instruments.

3. Color: To be selected from manufacturer's full color range.

2.3 COMPONENTS - LOCKERS

A. Locker Doors and Frames: 1/2 inch thick.

B. Sides, Tops, Bottoms, Backs, and Shelves: 3/8 inch thick.

C. Latch: Continuous type, manufactured from HDPE, capable of accepting various locking mechanisms, fastened to entire length of door.

D. Door Hinge: Heavy duty extruded aluminum, full length, assembled onto door and locker front.

E. Assembly Profile: Full height of lockers, PVC plastic, snap fit assembled onto locker sides.

F. Coat Hooks: Two-prong, high impact plastic, mounted to bottom of shelf or divider, one per door opening.

2.4 COMPONENTS - LOCKER BENCHES

A. Bench Tops: 1-1/2 inch thick laminated and doweled maple bench top with bullnose edges rounded to 5/8 inch radius. 9-1/2 inches wide x length as indicated on the plans.

B. Pedestals: Aluminum, 16 inches high secured to tops with stainless steel tamper resistant Torx head screws and to floor with lead expansion shields and 2 inch long stainless steel machine bolts.

2.5 FABRICATION

A. Fabricate locker components square and rigid, finish free from scratches and chips.

B. Fabricate locker components for snap-together assembly or slide-together dovetail connections providing solid and secure, anti-racking construction.

C. Fabricate adjacent lockers with common side panel.

D. Fabricate locker units for assembly in maximum of three adjacent lockers.

E. Fabricate locker benches to sizes indicated in single lengths.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install lockers in accordance with manufacturer's instructions and approved Shop Drawings.

B. Set lockers on prepared locker base.

C. Set plumb, level, rigid, and aligned.

D. Attach lockers to supporting construction with anchors best suited to substrate conditions.

E. Attach locker benches to floor.

3.2 ADJUSTING

A. Adjust doors and latches to operate correctly.

END OF SECTION

SECTION 10 80 00
TOILET ACCESSORIES

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

B. Toilet accessories as indicated on the drawings and as specified herein.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Concealed backing.

1.04 SUBMITTALS

A. Material list, catalog cuts, finish samples in conformance with Section 01340.

1.05 MANUFACTURERS

A. Manufacturers' “American Specialties Inc.” model numbers indicate the description for design and material. Proposed equals shall demonstrate equality in every feature of design and material, exposed or concealed. The minimum standard for stainless steel shall be Type 304.

2.00 MATERIALS

2.01 PRODUCTS

A. Soap Dispenser: ASI #0356 at lavatory units toilet rooms.

B. Surface-Mounted Towel Dispenser: ASI #20210.

C. Recessed Multi-Roll Toilet Tissue Dispenser: ASI #9031. As indicated on the drawings. Installed at accessible stall. Complying with CBC 115B.8.4. Dispenser shall be continuous flow type.

D. ASI #0032 Dual access partition mounted double roll toilet paper dispenser.

E. Toilet Seat Cover Dispenser (surface-mounted): ASI #20477-SMI as indicated on the drawings. One at each toilet stall.

F. Grab Bars: ASI

1. 1 1/4” x 36” – 3700 Series. One per accessible toilet or stall.

2. 1 1/4” x 42” – 3700 Series. One per accessible toilet or stall.

3. The grab bar cannot project more than 3” into the 48” minimum clear space in front of the water closet. 1115B.7.1.3. Toilet paper and feminine napkin dispensers located on the grab bar side of an accessible toilet room or stall should not project more than the grab bar. The accessory shall not be located closer than 1 ½” clear of the tangent point of the grab bar. Accessories surfaces mounted above grab bar will restrict usability.

G. Feminine napkin disposal unit ASI #20852 as shown on drawings shall not project more than 3” from the finished wall surface nor be located closer than 1-1/2” clear or the tangent point of the grab bar. (4 total, rooms 102, 105, 107, and 113C)

H. Framed Mirrors: ASI #0620 Channel Frame Mirror (surface mounted); size as indicated on the drawings. At single occupancy coach toilet room only. (2 total)

I. Lavatory Pipe Insulation: Wheelchair accessible toilet hot water and waste piping under lavatories shall be wrapped with Brocar Products, Inc., ‘Trap Wrap”, with all required accessory materials per manufacturer’s recommendations. Alternate Manufacturer: Truebro, Inc.

J. Surface-Mounted Toilet Paper Holder ASI #9030.

K. Single Robe Hook ASI Model #7340. Mount on interior side of each toilet stall partition door. Mounted 48” max. above the finish floor.

L. Heavy-Duty Recessed Soap Dish: ASI #0399.

M. Extra Heavy-Duty Shower Curtain Rod ASI #1204, Curtain ASI #1200-V, and Curtain Hook ASI #1200-SHU.

N. “L-Shaped” Phenolic Fold-Up Shower Stall Seat ASI #8206.

3.00 EXECUTION

3.01 COORDINATION

A. Concealed backing, specified elsewhere, shall be located by the installer of work in this Section.

3.02 INSTALLATION

A. Install all items where indicated, in conformance with accessibility requirements of the State of California. Fasteners shall be installed into solid blocking, square with adjacent edges and surfaces.

B. All operating devices shall function smoothly.

C. Access keys (two minimum) shall operate smoothly.

D. Fasteners except as otherwise indicated, shall be vandal proof.

E. Toilet accessories required to be accessible shall be mounted at heights according to CBC Section 1115B.8.

3.03 APPROVAL

A. All units shall match catalog cuts in design and function.

B. Surfaces shall be whole, uniform in finish and free from blemish.

C. Containers shall be tightly jointed, free of distortion.

END OF SECTION

SECTION 11 06 20
STAGE CURTAINS AND TRACKS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DEFINITIONS

A. The term "Contractor" shall mean the contracting entity, also referred to herein as Drapery Contractor or Manufacturer, responsible for the fabrication, assembly, installation, testing, instruction and completion of all drapery work as covered in these Specifications and related Drawings.

B. Technical terms unique to stage drapery and related work shall be construed in the following order, in accordance with:

1. Captions on related Drawings.

2. Generally recognized theatrical usage.

3. Relevant usage and definitions of handbooks, guidebooks, or trade group recommendations by manufacturers' associations or professional and engineering societies.

1.03 SCOPE: All materials, components, and services necessary to provide a complete system indicated in this Section, as specified herein and shown on related Drawings, including:

A. Preparation and submission of samples for review prior to fabrication.

B. Verification of dimensions and conditions at the job site.

C. Shipment of equipment to job site.

D. Installation and completion, in accordance with these Specifications, related Drawings, the Equipment Manufacturer's recommendations, established trade criteria, and all applicable code requirements.

E. The inspection, demonstration, and necessary adjustment of the completed installation by the Contractor's personnel.

F. Preparation and submission of complete maintenance data and certificates.

1.04 WORK INCLUDED

A. Stage curtains, tracks and suspension hardware.

1.05 QUALIFICATIONS

A. All equipment and installation shall be the responsibility of a single contactor who shall own and operate a full-time, staffed sewing shop for the fabrication and assembly of stage drapery. This Contractor shall assume complete responsibility for the design, fabrication, transportation, and installation of the work in this Section.

B. The Contractor shall have at least ten (10) years experience in the fabrication and installation of similar equipment and systems for similar theatres. If requested, the Contractor shall submit a representative list of similar theatre installations during the above period.

C. Subject to the above requirements, work performed under this Section may be by one of the following listed contractors:

1. Tru Roll, Inc., Glendale, California (818) 240-4835

1.06 SUBMITTALS

A. With bid

1. Proof that the firm has been continuously engaged in fabrication and installation of stage rigging and drapery for similar theatres during the past ten (10) consecutive years.

2. A list of at least three (3) similar drapery installations by the bidder comparable to this project in scope.

3. A list of any proposed deviations or exceptions from the Specifications. Any deviations or exceptions from the Specification proposed after bid shall not be accepted.

4. A schedule for the anticipated completion of the following:

a. Samples

b. Delivery of all equipment

c. Installation of all systems

B. Samples. Within thirty (30) days of contract award, the Contractor shall submit to the Architect for review prior to fabrication

1. Color lines for all fabrics, for color selection by Architect.

2. Samples shall not be considered part of specified quantities but shall be returned.

C. Final submittal. Within thirty (30) days of final tests, and as a condition for final review, the Contractor shall submit to the Architect:

1. Three (3) bound sets to the General Contractor:

a. Operation and service manuals, schematics, and parts lists for each unit of equipment installed and provided.

b. Flameproofing certificates.

c. Certificates of warranty.

2.00 PRODUCTS

2.01 CURTAINS

A. Fabrics

1. All fabrics not inherently flameproof shall be fully mill flame proofed by the immersion process to meet or exceed the minimum requirements set forth by NFPA "Small Scale 701." The Contractor shall submit certificates so stating.

2. All fabrics shall be produced from one dye lot per color. Color quality shall be consistent throughout, with no visible streaking, striping, or spotting.

3. All curtain color selections shall be submitted to the Architect. Final color approval by Architect is required prior to ordering fabric.

4. Velour-Main Curtain and Teaser. 100% combed cotton velour, 54 inches wide, weighing 25 oz. per linear yard after flameproofing. "Memorable" as manufactured by KM Fabrics, Inc., Greenville, South Carolina.

   a. 44 backing ends per inch

   b. 44 pile ends per inch

   c. 44 picks per inch

   d. 968 pile tufts per square inch

   e. Pile height: approximately .094 inch

5. Lining. 100% cotton, 54 inches wide. Dazian Lining Denim, or approved equal. Flame-proofed. Color: Black

6. Velour – Legs, borders, travelers. 100% combed cotton velour, 54 inches wide, weighing 20 oz. per lineal yard after flameproofing. "Marvel" as manufactured by K.M. Fabrics Inc., Greenville, South Carolina.

   a. 40 backing ends per inch

   b. 40 pipe ends per inch

   c. 640 pile tufts per square inch

   d. 32 picks per inch

   e. Pile height: approximately .110 inch

   * No lining required.

B. Fabrication

1. General

   a. Unless otherwise noted, all pile fabrics shall pile running down.

   b. All seams shall be vertical, unless otherwise specifically indicated. All fabric widths shall run full height, with no vertical pleating.

c. Thread colors shall match face fabric.

d. Every curtain shall contain a permanent label sewn to the off-stage end of the curtain. This label shall indicate fabric, color, finished size, and method and date of flameproofing.

e. Sizes and quantities per Drawings and Schedules.

2. Main curtain

a. Fabric pile shall run down. Curtain sewn with 75% fullness.

b. Top hem shall be single turned and reinforced with continuous 3 1/2 " heavy jute webbing. Fullness shall be sewn into the curtain by means of box pleats 12 inches O.C. Two No. 2 brass grommets shall be provided at each top corner of each finished panel and one grommet shall be provided at the center of each box pleat along the top hem. One heavy duty 1 1/2" S-hook shall be provided for each grommet for attachment to track.

c. Bottom hem shall be 6 inch double turned and contain a continuous No. 8 plated jack chain held in a separate muslin pocket 5 inches above bottom of curtain.

d. On-stage vertical hems shall be faced back with one-half width of face fabric. Off-stage hems 6".

e. Lining shall be applied with the same fullness as the face fabric. The lining shall be sewn to the face fabric only along the top and bottom hems. An inverted tuck of 6 inches at the bottom shall be sewn into the lining to allow for shrinkage difference between the face fabric and lining. The side hems of the lining shall be 2 inch single turned and shall be attached to the inside edge of the face fabric's vertical hems by means of continuous twill tape laced through tapeloops attached to both curtains 18 inches O.C. and evenly staggered between the two panels.

f. Front curtain height shall be determined by field measurement, to ensure that top of curtain is not visible from any seat in auditorium.

3. Valance

a. Fabric pile shall run down sewn with 75% fullness, lined.

b. Top hem shall be single turned and reinforced with continuous 3 ½" heavy jute webbing. Fullness shall be sewn into the curtain by means of box pleats 12 inches O.C. One No. 2 brass grommet shall be provided at each top corner of each finished panel and one grommet shall be provided at the center of each box pleat along the top hem. One tie line shall be provided for each grommet. Tie lines shall be braided cotton, black in color, and 30 inches long.

c. Bottom hem shall be 6 inch double turned and shall contain a continuous No. 8 plated jack chain held in a separate muslin pocket one inch above bottom of curtain and tacked at each vertical seam to prevent bunching.

d. Vertical hems shall be 2 inch double turned.

e. Lining shall be applied with the same fullness as the face fabric, and an inverted tuck of 4 inches at the bottom shall be provided to allow for shrinkage difference between face fabric and lining.

4. Legs

a. Top hem shall be single turned and reinforced with continuous 3 ½" heavy jute webbing. One No. 2 brass grommet shall be provided at each top corner of each finished panel and 6 inches O.C. along the top hem. One tie line shall be provided for each grommet. Tie lines shall be braided cotton, black in color, and 30 inches long.

b. Bottom hem shall be 6 inch double turned and contain a continuous No. 8 plated jack chain held in a separate muslin pocket one inch above bottom of curtain and tacked at each vertical seam to prevent bunching.

c. Vertical hems shall be 4 inch double turned.

d. Legs sewn with 50% fullness, unlined.

5. Travelers

a. Top hem shall be single turned and reinforced with continuous 3 1/2" heavy jute webbing. One No. 2 brass grommet shall be provided at each top corner of each panel and 12 inches O.C. along the top hem. One heavy duty 1 1/2" S-hook shall be provided for each grommet for attachment to track.

b. Bottom hem shall be 6 inch double turned and contain a continuous No. 8 plated jack chain held in a separate muslin pocket one inch above bottom of curtain and tacked at each vertical seam to prevent bunching.

c. On stage vertical hems shall be faced back with one-half width of fabric with an off-stage hem of 6 inches.

d. Traveler sewn with 50% fullness, unlined.

6. Borders

a. Top hem shall be single turned and reinforced with continuous 3 ½" heavy jute webbing. One No. 2 brass grommet shall be provided on each top corner of each finished panel and 12 inches O.C. along the top hem. One tie line shall be provided for each grommet. Tie lines shall be braided cotton, black in color, and 30 inches long.

b. Bottom hem shall be 6 inches.

c. Vertical hems shall be 4 inch double turned.

d. Border sewn with 50% fullness, unlined.

C. Fabricate and install as shown in the Drawings.

2.01 STAGE DRAPERY SCHEDULE

A. 1 each - Main Valance

B. 1 pair - Main Traveler

C. 2 each - Borders

D. 2 pair - Pivot Legs

E. 1 pair - Upstage Traveler

3.00 EXECUTION

3.01 CURTAIN COMPONENTS

A. Traveler Tracks

1. Drapery traveler tracks shall be steel, not less than 14 gauge galvanized roll-formed, with continuous bottom sloth and with each half of track in one continuous piece. Provide curtain carriers for track spaced on 12” on centers. Equip track with live end double pulley and dead end single pulley, with 4” nominal cast iron wheels on bearings enclosed in steel housings.

2. Provide curtain carriers of molded nylon with pairs of polyethylene, ball bearing wheels rived parallel to the carrier body. Equip carriers with neoprene or rubber bumper heavy-duty swivel eye and trim chain for attachment of curtain snap or S-hook. Provide steel end stops for track and adjustable floor block designed to maintain proper tension on 3/8” stretch resistant operating line of braided polypropylene or fiberglass center cord.
3. Track sections shall be designed to provided minimum 2’-0” overlap in each direction.

4. Provided the quantities and lengths of traveler tracks as shown on the drawings.

5. Track to be Tru Roll No. 1000 Ball Bearing rigged complete for manual bi-parting operation.

B. Pivot Legs – Tru Roll No. 1006PB ball bearing pivot leader, and track with 2” dia. Tube in length and quantity as indicated on drawings.

C. Border Battens – 1.1/2” schedule 40 black iron pipe straight, painted flat black and sleeved in length and quantity as indicated on drawings. Where splices are required, make butt joints using tight fitting internal sleeves 24” long.

3.02 MANUFFACTURERS, TRACK

A. Products of the following manufacturers from the basis for design and quantity intended.

1. Tru Roll Incorporated, Glendale, CA 818-240-4835.

3.03 INSTALLATION

A. Install work in accordance with manufacturer's instructions.

B. Secure tracks and battens directly to support backing in accordance with approved shop drawings.

END OF SECTION

SECTION 11 13 00
PROJECTION SCREENS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Manually operated front projection screens at all classrooms.

2. Automatic electric projection screen at Theater.

2. Supplementary parts and components such as inserts, clips, fasteners, anchors, and other miscellaneous supports and accessories required for a complete installation.

3. Universal Projector mount.

B. Related Work:

1. Metal Fabrications for Support Systems: Reference Section 05 50 00.

1.03 SUBMITTALS

A. Procedure: In accordance with Section 01340.

1. Product data for each type of screen specified.

2. Shop drawings showing layout and types of projection screens. Show the following:

a. Each screen size and details of interface with supports and adjacent materials specific to this Project.

b. Location of screen centerline.

c. Large scale attachment details.

d. Accessories.

4. Manufacturer's recommendations and instructions on maintenance and cleaning of the projection screens and their operation instructions.

1.04 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of projection screen required from a single manufacturer as a complete unit, including necessary mounting hardware and accessories.

B. Regulatory Requirements: Electrically operated screen assembly shall be UL listed and shall bear the UL re-examination markers.

C. Installer's Qualifications: Firm approved by the screen manufacturer and who has successfully completed installations similar in material, design, and extent to that indicated for the Project for the past three (3) years.

1.05 HANDLING

A. Procedure: In accordance with Section 01600.

B. Do not deliver projection screens until building is enclosed, other construction within spaces where screens will be installed is substantially complete, and installation of screens is ready to take place.

C. Protect screens from damage during delivery, handling, storage, and installation.

2.00 PRODUCTS

2.01 MANUFACTURERS/MATERIALS

A. Products:

1. Access/Series M and Access/Series MultiView for manually operated units, all by Draper Shade & Screen Co., Inc. are specified to establish a standard of quality, function and design. Other acceptable manufacturers include:

a. Da-Lite Screen Co., Inc.

b. Bretford Manufacturing, Inc.

c. Projection Screen Surfaces: Seamless, plain matte white viewing surface with minimum gain characteristics complying with FS GG-S-00172D(1) for Type A screen surface.

d. Mildew Resistance: Mildew-resistant screen fabrics as determined by Federal Standard 191A/5760.

e. Fire Performance Characteristics: Screen fabrics identical to those materials that have undergone testing and passed requirements for flame resistance as specified below.

f. NFPA 701 per small-scale test.

g. Federal Standard 191A/5903 for test method. FS GG-S-00172D(1) for flame resistance.

2. Da-Lite Wireline Advantage Theater Screen

a. Automatic electric projection Sressn

2.02 MANUFACTURERS/MATERIALS

A. General: Provide manufacturer's standard units consisting of case, screen, mounting accessories and other components as required for a complete installation and complete installation and complying with descriptive requirements indicated below.

B. Classroom Spring-Roller-Operated Projection Screens:

1. Units designed and fabricated for wall or ceiling installation and complying with the following requirements:

a. Screen Case: Da-Lite Model “C” with CRS (controlled screen return) fabricated in one piece from not less than 21 gage steel with flat back design. Vinyl-covered or baked-enamel finish, and end caps with integral roller brackets. Provide ceiling trim kit for recessed mounting for classrooms with suspended ceilings.

b. Screen: 7 ft. by 7 ft. without border, pull-down, with 6-in. extension bracket on each end. Vinyl-coated matte white glass fiber fabric with top edge mounted on, and securely anchored to, a 3 in. diameter rigid steel spring roller. Bottom edge formed into pocket holding a tubular metal slat with ends of slat protected by plastic caps and saddle and pull attached to slat by screws.

C. Theater Automatic Electrical Projection Screen:

1. Da-Lite Wireline Advantage Model w/ case 108” x 192”, HDTV (16:9) Format Dimensions, Electrically operated 120 volt 3.0 amp motor mounted inside the roller. Preset but adjustable limits to automatically stop picture surface in the “up” and “down” positions. Screen Fabric shall be flame retardant and mildew resistant vinyl with black masking borders standard (HD Progressive 1.1 viewing surface). Screen to be furnished with Radio Frequency Wireless Remote and Dry Contact Input Transmitter and optional Radio Frequency single channel wall switch.

2.03 DRAPER ACCUSET PROJECTOR MOUNTS

A. Draper SMS universal projector bracket and Accuset low profile suspended ceiling panel. At typical classroom.

3.00 EXECUTION

3.01 INSTALLATION

A. General: Install screens plumb, level and securely anchored, in compliance with the screen manufacturer's instructions.

1. Test manually operated units to verify that screen operating components are in optimum functioning condition.

2. Adjust and lubricate mechanisms as required.

B. PROTECTION AND CLEANING

1. Protect projection screens after installation from damage during construction.

2. If despite such protection damage occurs, remove and replace damaged components or entire unit as required to provide units in their original, undamaged condition.

END OF SECTION

SECTION 11 48 10
ELECTRONIC SCOREBOARD

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Electronic scoreboard as indicated on Drawings and specified herein.

2. Shot Clocks with protective wireguard.

B. Related Work:

1. Structural support: Sections 05 12 00 and 05 40 00.

2. Electrical power and conduits – see electrical drawings.

1.03 SUBMITTALS

A. Procedure: In accordance with Section 01340.

B. Brochures, and installation and operating instructions.

1.04 QUALITY ASSURANCE

A. Installer's qualifications: Firm approved by scoreboard manufacturer.

B. Warranty: Provide manufacturer's standard 5-year warranty.

2.00 PRODUCTS

2.01 MANUFACTURER

A. Nevco Scoreboard Co. (800.851.4040), Model 2550-D with basketball and volleyball captions and complete with No. MP69 Control Console. Provide two (2) sets of scoreboards and MPC-4 controls in Gymnasium. Color to be selected by District.

B. Nevco Shot Clocks Model SCD-75 LED Shot Clocks with game time and end of period light.

2.02 MINIMUM FEATURES

A. Scoreboards (two required), UL listed/CSA certified, remotely operated from one control station. Display(s) minutes, seconds, 1/10th seconds, team scores, period, bonus, jump ball "next possession," and "changeable" captions for basketball/volleyball/wrestling on multi-purpose lower section, using low voltage 100% Solid State 2-wire cable multiplex system, quartz crystal controlled.

COASTAL CHRISTIAN SCHOOL

B. Scoreboard: Constructed of aluminum. Scoreboard polyurethane epoxy finish. Brackets provided for wall mounting. Hanging weight approximately 165 lbs. Shipped assembled with no field assembly required.

C. Control center: Provide one Model MPC Microprocessor-based operator's control. Construction of break-resistant plastic. Include hand-held time switch, 25 ft. of cable with connectors, and keyboard overlay.

1. Control features: Bright traveling alpha-numeric dot matrix LED display, lithium cell battery backup to retain memory, self-test mode power off-on switch, alternate time switch, internal beeper which acknowledges each entry, multiple scoreboard control capability.

2. Scoreboards with timers, additional features: Time of day display, time out timer with warning, interval horn, upcount auto stop-horn, 1/10th seconds display during last minute. Control may be used to operate manufacturer's scoreboards for other sports by interchange of keyboard overlay.

3. Additional features displayed on the MPC control center for basketball use: Player foul memory to record personal fouls by uniform number, and time outs left.

D. Dimmer: Lamp intensity dimmer activated from operator's control center keyboard.

E. Lamp banks: 4 x 7 matrix, recessed individual aluminum reflectors, 7 watt, 120 volt lamps, 13 in. and 9 in. high.

F. Timing: Bi-directional UP or DOWN count. Any number of minutes or seconds can be directly set, capacity 0:00 - 99:59. Lamp color, red. Timer displays 1/10th seconds during final minute of period by shifting the numerals on time display on scoreboard to show seconds to the left of the colon and 1/10th seconds to the right. Decimal lights instead of the colon when 1/10ths are displayed. In place of displaying game time on scoreboard, "time out" time may be displayed or "time of day." Time of day can still display on scoreboard after MPC control is unplugged.

G. Team scores: 2 scores. Scores may be selectively set to any number, capacity 0 - 199. Additive mode also provided. Lamps color, orange.

H. Multi-purpose lower section: Separate keyboard overlays for the operator's control are provided for basketball, volleyball, and wrestling use, allowing the proper features and captions to be operated. Fouls for each team registers 0 - 19. Lamp color, orange. Basketball player uniform number 0 - 99, and player personal foul 0 - 9. Lamp color, red. For volleyball, number of games won by each team are displayed and the game number being played is indicated, plus which team is serving. For wrestling, the weight class is displayed or another control mode can by entered from the keyboard and weight display becomes a bi-directional advantage timer with indicators showing which participant has the advantage. Both advantage time and main time can be displayed at the same time on the operator's control read-out. Reset button allows advantage time to be cleared to 0 at any time. Scoring for the bout also is kept on the wrestling section.

I. Horn: Located in scoreboard. Sound automatically at 0:00 for a minimum of 2 seconds. Operator may select to omit automatic horn. Horn may be sounded manually at any time.

J. Captions: Back-lit, Home and Guests, fouls, player, won, game, bout, weight, 6 in. letters, period 4 in. numerals 1 2 3 4; bonus (B) possession (arrows) 3 in.; "period," non-illuminated changeable 6 in. letters. Extra plate with other imprinting optionally available.

COASTAL CHRISTIAN SCHOOL

K. Control cable: One length required per scoreboard of 2-wire cable (coaxial type), 1/4 in. diameter. Order cable required, from scoreboard to point where the control plugs in, from manufacturers.

L. Power: Each requires earth ground.

1. Scoreboard: 20 amp, 115 volt, 60 Hz.

2. Control center: 10 watts, 115 volt, 60 Hz.

M. Junction boxes: Two 4 in. x 2-1/8 in. x 2-1/8 in. with covers furnished per scoreboard, for wall installation.

N. Two (2) Shot Clocks Model No. SCD-75 with protective wireguard.

3.00 EXECUTION

3.01 INSTALLATION

A. Install where indicated in conformance with manufacturer's written instructions. Angles, clips, brackets and fasteners shall support unit from the structure to resist seismic forces applied in any direction.

B. Unit shall function in conformance with the manufacturer's submittals.

C. Mounting shall be neat, with power junction boxes recessed in the fire-rated wall.

D. Exposed surfaces shall be free of damage. Finishes shall be unblemished and clean.

END OF SECTION

COASTAL CHRISTIAN SCHOOL

SECTION 11 52 10
ASSISTIVE LISTENING SYSTEM

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Work in this Section Includes:

1. Radio Frequency Hearing Assistance System to comply with the provisions of CBC Section 11B-216.10, 11B-219.

2. Permanently installed assistive listening system – one (1) system for Gymnasium and one (1) system for Theater.

B. Related work in other Sections include:

1. See Electrical Drawings

1.03 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contractand Section 01300.

B. Submit outline drawing of system showing relative positions of all major components.

C. Submit a certificate of completion of installation and service training from the system manufacturer.

1.04 GENERAL REQUIREMENTS

A. The system shall be supplied by the manufacturer's authorized representative. Certification shall be submitted verifying that the contractor is the manufacturer's authorized representative. Included shall be certificates of attendance in manufacturer's installation/maintenance training by the contractors directly employed personnel. The communications contracting company shall have been in business for a minimum of 5 years, continuously furnishing the specified manufacturer's product linesand systems.

B The system assemblies shall be completely factory built and tested by manufacturers of established reputation, who have and can refer to similar systems which are currently installed and functioning properly.

C. The system shall be guaranteed for a period of two years from the date of acceptanceor first beneficial use, whichever is first, against defects in materials, workmanship, design and improper adjustment. Any defects in the system shall be corrected at no

expense to the Owner, provided the system does not show signs of abuse. During the guarantee period any work found not to be in conformance with the plans, specifications and addenda shall be brought into conformity with same at no additional cost to the District.

D. The contractor shall instruct personnel designated by the District in the proper use, basic care and maintenance of the equipment. Such training shall be provided as an integral component of the system.

1.05 OPERATIONS AND MAINTENANCE MANUALS

A. Provide 4 complete bound O & M manuals describing maintenance and operation of the system. Include descriptions and service data on all component parts. Manual shall also include the following:

1. Warranty statement indicating effective dates.

2. Complete engineering data on all systems furnished, including schematics of all equipment, shop drawings on all specially fabricated items, wiring diagrams ofthe system in its “as built” condition.

3. Instructions on operational procedures, including master and substation operation, standard and special codes and alarm or maintenance indicationsand procedures.

2.00 PRODUCTS

2.01 EQUIPMENT (Two [2] complete systems required)

A. Hearing Assistance System: Radio Frequency Hearing Assistance System shall be as manufactured by Genter Assistive Listening Systems, (219) 929-4127, or approved equal, and shall consist of the following components:

1. Model No. TX-37A Transmitter. The Transmitter shall operate on 37 FCC-approved frequencies for RF assistive listening, and transmit to an area of at least 700 sq. ft. Transmitter shall have universal input to accept mic level, balanced and unbalanced line levels, and speaker level. Signal strength shall be adjustable to quarter power, half power, or full power.

2. Model No. Digital-1 Receiver. Receiver shall capable of digital tuning to lock on to desired frequency, and be field tunable to all FM assistive listening channels. Total number of receivers supplied for the project shall be as indicated on the drawings.

3. Model No. BC-10B Battery Charger. Unit shall be capable of storing or trickle charging up to 10 receivers at one time (using NiCad or NiMH batteries). The charger must be capable of charging without removing the batteries from the receiver. The charger shall have LED status indicators showing charging status of each slot. A total of one (1) battery charger shall be provided for the project.

4. Single Rack Mount Kit. Manufacturer's standard rack mount kit to fit one transmitter into a standard 19-inch equipment rack, consisting of two metal components that fit on each side of the transmitter.

3.00 EXECUTION

3.01 INSTALLATION

A. All installation work under this section shall be performed by persons having specific familiarity with telephone, data and sound system installation. Upon request the contractor shall submit resumes, references or other corroborating documentation, tothe engineer to confirm the contractor's capabilities and experience.

3.02 TESTING AND TRAINING

A. Upon completion of the installation the contractor shall test each room device for proper operation. Any malfunction shall be corrected prior to final acceptance.

B. Operational guidelines shall be given in written form in sufficient numbers so that all key personnel have operational instructions of programming, station use and special features.

END OF SECTION

SECTION 11 66 00
ATHLETIC EQUIPMENT

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 WORK INCLUDED

A. Furnish and install the athletic equipment work as indicated on the Drawings and as specified herein. Included in this Section are Alternates for the athletic equipment. Athletic equipment shall include but not be limited to:

1. Power-Touch Gymnasium Control Systems

2. Basketball Backstops (with Powder Coated Finish)

3. Volleyball Game Standards

4. Wall Padding (Fire Retardant)

5. Gymnasium Divider.

1.03 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Cast-In-Place Concrete - Section 03 30 00.

2. Structural Steel - Section 05 12 00.

3. Electronic Scoreboard – Section 11 48 10.

1.04 REFERENCES

A. Equipment specified shall conform to the latest rules and regulations of the National Federation of State High School Association (NFSHSA) and the National Collegiate Athletic Association (NCAA).

1.05 SUBMITTALS

A. Manufacturer's Product Data Catalog sheets, specifications and installation instruction for each item of equipment and apparatus.

B. Shop drawing Plan of gymnasium at 1/8" scale, showing locations of all items and apparatus equipment; and 3/4" scale details for installation and anchorage of items and equipment, where applicable. Submit shop drawing for owner's approval prior to fabrication.

C. Indicate each item being furnished, including materials, quantities, locations, connections and fasteners.

D. Submit copy of manufacturers Certificate of Insurance.

E. Quality Control Submittals

1. Certificates: Affidavit, signed by the Company field advisor and notarized, certifying that the equipment meets the Contract requirements and is operating properly.

2. Company Field Advisor Data: Include name, business address and telephone number of Company Field Advisor, secured for the required services. If required, include certified statement from the company listing the qualifications of the Company Field Advisor.

F. Contract Closeout Submittals:

Operation and Maintenance data: Deliver two copies, covering the installed products, to the Architect. Include name, address and telephone number of the nearest fully equipped service organization.

1.06 QUALITY ASSURANCE

A. Manufacturer: Minimum of five years successful experience in the manufacturer of the type of the respective product specified. Manufacturer shall be represented by a local agency to provide maintenance and service of specified equipment.

B. Equipment shall be provided by a single source manufacturer in order to establish and assure a consistent warranty/service policy.

C. Installer: Minimum of three years successful experience in installation of the type of the respective items specified.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all products of this Section as recommended by the respective product manufacturer, to protect from damage.

1.08 WARRANTY

A. Provided one-year warranty against defects in materials and workmanship. Provide limited lifetime warranty on all Porter backboards when used in conjunction with the No.900 "Center-Strut" series backstops. Backstop structure without said warranty will not be approved as equal. Extended Warranties shall be in force on other items as listed in product specifications.

1.09 ENGINEERING DATA

A. The overhead attachments of the basketball backstops have been located in keeping with static equivalent loading and point reactions furnished by the prime specified manufacture. Should a manufacture, other than the prime specified be selected, that manufacture must submit static loads and point reactions for each basketball backstop. All calculations must be submitted complete for each backstop showing hanger and hoist pulley points. General load charts or generic product laboratory test data will not be considered sufficient data for approval.

1.10 PROJECT CONDITIONS

A. Loose items of equipment shall be turned over to the Owner after unpacking or uncrating, and checking for proper type, material, size and fit of each accessory. Obtain receipt from Owner for items turned over. No claim may be made for items turned over to the Owner without obtaining a receipt.

2.00 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. The athletic equipment specified, in order to establish a basis of design, performance and quality, is based on products manufactured by the Porter Athletic Equipment Company, 2500 South 25th Avenue, Broadview Illinois, 60153 1-800-94PORTER.

B. Products manufactured by American Athletic Inc., Jefferson, Iowa and ,JayPro Sports Equipment, Waterford, CT, Schelde North America, Grand Rapids, MI and Senoh Volleyball Systems, Columbus, OH may be used providing they meet every detail of the specification. No substitutions may be made without prior approval by the Architect with notice to all contractors.

C. The approval of other manufacturer's names and product numbers do not relieve the contractor from furnishing products which comply with all of the detailed requirements of these specifications.

D. Manufacturers products shall be standard cataloged items and shall be a consistently offered line of equipment. Manufacturers published literature must clearly show that the products being furnished are in compliance with these specifications.

2.02 POWR-TOUCH GYMNASIUM CONTROL SYSTEMS

A. Powr-Touch Gymnasium Control Center: manufacturer Model: Porter Athletic Equipment No.2500 JayPro No.MEC-99

1. Control system to operate all Porter Athletic Equipment electric winches, and provide power control for auxiliary equipment with a 110-voltage requirement.

2. Touch pad control shall be capable of operating a maximum of 128 basketball backstops or other gymnasium apparatus and 32 units of auxiliary equipment. Touch pad shall incorporate a four-digit programmable security code to prevent usage by unauthorized personnel. The touch pad security code may be reprogrammed to prevent unauthorized usage. Touch pad to automatically revert back to the secure mode if any button is not used within a ten second period.

3. Touch pad assemblies shall be flush mounted on wall in a standard two-gang electrical box with a 12-volt control circuit to relay panels strategically located on walls or roof framing. Provide (2) touch pad assemblies to allow for operation of all equipment from each end of gymnasium.

4. The Powr-Touch control system shall include relay panels (16 maximum), each of which is capable of operating eight momentary controlled-type (up and down) equipment and two maintained relays for operation of lighting, etc. Size of each relay panel enclosure is 4" x 12" x 15".

5. Wiring of all electrical components shall be in accordance with local area codes, and in accordance with manufacturer's instructions. All conduit, wiring, junction boxes, and components not specified herein shall be furnished and installed by the electrical contractor.

6. The Powr-Touch control system shall be provided with a Custom Equipment Legend. The wall-mounted legend allows the user to identify each piece of equipment and its corresponding number on the control system. Equipment legend shall consist of a piece of cardstock, 11" x 17" in size, preprinted with an accurate floor plan and equipment layout of the gymnasium or facility. A legend on the floor plan will identify each piece of equipment by number. The printed cardstock shall be secured to the wall behind a piece of 1/4" thick clear acrylic sheet, 11" x 18" in size. Mounting hardware shall be provided for masonry walls. Hardware for other types of wall construction shall be by others.

2.03 BASKETBALL BACKSTOPS

A. Ceiling Suspended Basketball Backstops

1. Ceiling Suspended, Forward Fold and Back Braced Backstop (with powder-coated finish). Manufacturer Model: Porter Athletic Equipment No.917-000 (Welded Frame),American Athletic Inc. No.0301016 (Welded Frame) or JayPro Sports Equipment No.817 FFRB (Welded Frame)

a. Center-Strut® vertical front drop frame assembly shall consist of a main, center mast of 6-5/8" O.D. (10 gauge) heavy wall structural steel tube with diagonal side sway braces of 2-1/2” x 1-1/2” rectangular steel tubing. Ends of diagonal brace tubes shall be precision machine cut to provide maximum weld surface contact to form a unitized, back-to-back triangular type structural design to provide superior lateral stability. (Formed, curved, pinch-cut or flattened type brace connections will not be approved as equal). Top horizontal mast hinge spreader to be of a heavy 4" structural channel to support adjustable suspension hangers.

b. Goal shall mount directly through backboard and into a heavy structural steel weldment Center-Strut® which shall be clamped to the vertical 6-5/8" O.D. center support to eliminate any strain on backboard should a player hang on the front mounted goal (conforms to the NCAA latest rules). All fittings shall be attached to the 6-5/8” O.D. vertical drop tube by heavy 1/4” thick precision saddle die-cut formed steel fittings secured in place by 5/8” diameter ‘U’-Bolt type hardware. The upper backboard extension assembly shall provide the official NCAA and NFSHSA regulation of 6" (15.24 cm) from the front of the Center-Strut® to the face of the backboard. Center-Strut® drop frame shall be suspended by special adjustable hangers to provide for precise plumbing of frame during installation. Support hangers shall be offset 1-1/2" behind centerline of Center-Strut® drop frame to properly weight lock unit in playing position without the use of ropes, latches or springs.

c. Backstop shall be supported from 3-1/2" O.D. pipe anchored to roof framing members by means of heavy formed, die-cut steel support fittings. Each attachment to building roof framing must be capable of supporting a load exceeding 10,000 pounds with sufficient attachment points to acquire a 60:1 safety factor for support of entire backstop support system. Certified test results shall be furnished upon request. Superstructure pipes to be reinforced with special truss-type bridging or bracing when truss centers exceed spans of 14'-0".

d. Back brace assembly shall consist of heavy-wall 1-7/8" O.D. pipe, with internal telescoping tube arrangement to facilitate rising of backstop to overhead storage position. Brace shall be provided with adjustable collar to precisely plumb face of backboard during installation.

e. All metal parts shall be provided with a durable baked powder-coated finish. Backstops are available in nine standard colors including white, grey, black, yellow, orange, red, medium blue, navy blue and forest green. To preserve and protect the powder-coated finish all backstops shall be custom wrapped with heavy-duty packaging.

f. Backstops shall be provided with a welded frame. Bolt together or knock down "KD" units shall not be approved as equal.

g. Electric Winch: Shall be Porter #706-000 heavy-duty electric winch design to hold units at any position when raising or lowering. Units shall be individually operated by 1/2 H.P. (9 AMP) capacitor type, 60 cycle, 115 VAC single phase electric motor with automatic thermal overload protection manufactured to NEMA specifications. The hoisting capacity shall be a minimum of 1,200 pounds. All conduit, wiring, junction boxes and components not specified herein shall be furnished and installed by the electrical contractor.

h. Provide Powr-Touch Gymnasium Control System.

2. Wall Braced Fold-Up Backstop (with powder-coated finish).
Manufacturer/Model:
Porter Athletic Equipment No.219-000
American Athletic Inc. No.0302704-E
JayPro Sports Equipment No.1400

a. Backstop shall be wall supported fold-up type. Face of bank shall be extended from supporting wall as indicated on Architects drawings. Extension frame shall be constructed of four (4) 1-7/8" O.D. pipes terminating in fabricated steel hinge plates. Hinges shall be offset type to allow backstops to be folded up to a position nearly flat against the wall. Frame shall be further braced by 3/16" x 1-1/4" tension flats terminating in precision die-formed clamps. Flat steel clamp-type fittings shall be used at intersection of tension flats.

b. Porter #FR-SAFPAD Wall pads shall be provided at all wall attachment points. All edges shall be chamfered, and pads shall be finished with two coats of natural gloss lacquer.

c. Provide each backstop with a basketball backstop safety lock. Lock shall be inertia sensitive to automatically lock a backstop in position at any time in storage or during the raising or lowering cycle. Safety lock shall incorporate a fully automatic reset requiring no poles, ropes, levers or buttons.

d. All metal parts shall be provided with a durable baked powder-coated finish. Backstops are available in nine standard colors including white, grey, black, yellow, orange, red, medium blue, navy blue and forest green. To preserve and protect the powder-coated finish all backstops shall be custom wrapped with heavy-duty packaging.

e. Electric Winch: Shall be Porter #706-000 heavy-duty electric winch design to hold units at any position when raising or lowering. Units shall be individually operated by 1/2 H.P. (9 AMP) capacitor type, 60 cycle, 115 VAC single phase electric motor with automatic thermal overload protection manufactured to NEMA specifications. All conduit, wiring, junction boxes and components not specified herein shall be furnished and installed by the electrical contractor.

f. Provide Powr-Touch Gymnasium Control System

g. Provide a Porter #10797-110 "Saf-Strap" Adapter Kit.

B. Basketball Goals, Backboards and Accessories:

1. Rectangular Tempered Glass Backboard Manufacturer Model: Porter Athletic Equipment No.208-000, American Athletic Inc. No.413-001(GB1sb) or JayPro Sports Equipment No.GBAFR-42

a. Backboard shall be 3'-6" x 6'-0" to meet all NCAA and NFHSA requirements. Backboard frame shall be of a welded, unitized construction fabricated from heavy wall rectangular steel tubing. Unitized frame shall include a vertical center strut with a unique spacer sleeve arrangement at the upper two goal mount hole locations to transmit undue loading during slam-dunks, etc. directly through the glass and into the rear frame.

b. Glass shall be provided in 1/2" thick, fully tempered (heat-treated) glass section with uniform load and impact strength. Official white border and target area is "fired in" permanently on front side of glass section so that it cannot wear away. Glass section shall be secured to unitized rear frame by means of an attractive, L-shaped steel perimeter frame finished in a durable gray powder coated finish. Backboard shall be protected by a lifetime warranty.

c. Provide Porter No.326 Bolt on Backboard Protective Safety Padding. Pad shall fit any official size (72" wide) glass backboard. Pad shall consist of two pieces with molded type square corners for maximum safety, appearance and durability. Pads shall be molded from Polyurethane Foam (9 lb. density) with integral skin (self-skinning). A positive, bolt-on type attachment system shall be provided to eliminate glue or peel and stick tape type attachment methods. Pad sections are provided with internal, molded in steel attachment channel sections, which are secured to the backboard with special self-drilling, self-tapping attachment hardware provided in kit. Pad meets all competition requirements of the NCAA and NFSHSA. Pad is furnished with a limited 8-year warranty. Color to be selected.

2. Ultra-Flex Goal Manufacturer/Model: Porter Athletic Equipment No.245-500, American Athletic Inc. No.0413577 or JayPro Sports Equipment No.GBA-342A

a. Goal shall incorporate a precision, case- hardened, high- tensile steel alloy torsion rod pivot rod design to allow tip of rim to flex approximately 2-1/2" (6.4cm) with a 230-pound (104kg) static load. Tamper-proof torsion rod/pivot mechanism shall be pre-loaded during manufacturing process to meet proper (NCAA, NFHS & FIBA) ball rebound/elasticity standards. Goal shall instantaneously return to the playing position when load is released. Torsion rod/pivot shall be designed to decelerate downward motion of goal on impact, to provide maximum player safety and minimize undue stresses on the backboard and support system. Goals incorporating shock absorber type mechanisms shall not be considered as equal.

b. Rim shall be fabricated from 5/8" (1.6cm) diameter cold drawn alloy steel, round formed to an 18" (45.7cm) inside diameter ring. Inside diameter of ring shall be positioned 6" (15cm) from face of backboard by a heavy,

1/4" (6.4mm) thick, formed steel hinged type housing. Heavy, 1/4" (6.4mm) thick formed steel goal mounting housing shall be fabricated with a keyhole type slot arrangement to facilitate mounting to backboard or direct-mount type support systems. Removable cover is provided to conceal mounting bolt hardware.

c. Rim shall be rigidly braced by means of a 3/16" (4.7mm) thick formed and die cut steel brace welded in position on the underside of the rim for maximum support. Rim shall be provided with a unique "tube-tie" net attachment system to eliminate the conventional wire-formed type net locks for additional player safety.

d. Goal shall be finished in a durable, official orange powder-coat finish. Durable, anti-whip type net and attachment hardware included. Goal to be provided with standard mounting centers for attachment to any 3'-6" x 6'-0" rectangular backboard.

f. Goal is furnished with a limited 5-year warranty.

3. Center-Strut®" Electric Height Adjustment Manufacturer Model: Porter Athletic Equipment No.901-506, American Athletic Inc. No. or JayPro Sports Equipment No.EAHA

a. Height adjustment unit shall provide an adjustable, direct mount (Center-Strut®) goal attachment system to eliminate any strain on the backboard should a player hang on the front mounted goal (conforms to the latest NCAA recommendation). Height adjustment units without the prescribed direct mount goal feature will not be approved as equal. Height adjustment feature will allow goal height settings from 8'-0" to the official 10'-0" for use by all age groups.

b. Center unitized support frame shall be fabricated by dual, 2-3/16" square heavy wall zinc plated guide tubes located on 11-3/16" centers. Ends of guide tubes shall be welded to heavy-formed mounting brackets. Heavy formed, die cut steel clamp assemblies (2) shall be provided for securing height adjustment assembly directly to a 6-5/8" O.D. center support structure. Outer dual slide tubes shall support heavy structural steel angle sections which extend downward to accept a direct mount (Center-Strut®) goal mounting system. Slide tube assembly shall be provided with a heavy-formed steel section to attach a special upper backboard support assembly to secure the unit to the upper two corners of the rectangular backboard.

c. Height adjustment unit shall incorporate a compact 115-volt, gear motor type linear actuator with 600 pound thrust capacity to raise and lower the goal height electronically. Integral limit switches shall provide automatic shut off at 8' and 10' goal heights.

d. Motor shall be controlled by Powr-Touch Gymnasium Control Center (No substitutions). For safety, the Powr-Touch Pad shall be located so that the operator has full view of the height adjuster while it is being operated. Wiring of all electrical components shall be in accordance with local codes and in accordance with manufacturer's instructions. All conduit, wiring, junction boxes, and components not specified herein shall be furnished and installed by the electrical contractor.

e. A height setting scale shall be located on the side of the unit to visually determine height settings from 8'-0" to 10'-0" in 3" increments.

f. Limited Lifetime warranty on all Porter backboards when used in conjunction with Center-Strut® height adjustment unit.

4. Basketball Safety Locks Manufacturer/Model: Porter Athletic Equipment No.10797 or JayPro Sports Equipment No. SBAL-30

a. Provide each backstop which is suspended over bleachers or a running track with a basketball safety lock. Lock shall be inertia-sensitive to automatically lock a basketball backstop in position at any time in storage or during the raising or lowering cycle. The safety lock shall incorporate a 2" wide nylon belt rated at a 6,000 pound breaking strength and entire unit to be tested to withstand a 1,500-pound free fall load. Strap shall extend a maximum of 35'-0" and shall be automatically retracted and stored on a reel equipped with a special negator type constant force spring. Operation and locking action of strap shall be by means of integral cast components, which are activated by centrifugal force to lock a basketball backstop before the unit travels 12" of free fall. Unit shall incorporate a fully automatic reset requiring no poles, ropes, levers or buttons.

2.04 VOLLEYBALL GAME STANDARDS AND EQUIPMENT

A. Professional Volleyball Game Standards and Pads: Manufacturer/Model: Porter No.1991 Uprights and No. 1992 center post w/No.830 Pads Senoh No.DE10 w/ No.SP3 Safety Pads Schelde No.67338 & 67339 Uprights w/ 67815 Pads

1. Posts shall be telescoping type with infinite height adjustment settings to meet all USVBA, NCAA and NFSHSA requirements for competition. Posts shall be furnished with height marking labels for BOYS'/MEN'S height setting of 7' 11-5/8" (2.43m), GIRLS'/WOMEN'S height setting of 7' 4-1/8" (2.24m), and 12 YEAR AND UNDER height setting of 7'-0" (2.13m).

2. Bottom upright shall be extruded of 6063T6 high strength, lightweight aluminum alloy with a special internal reinforcing rib pattern. (Non-telescoping or steel uprights will not be approved as equal.) Upright shall be 3-1/2" (8.9cm) O.D. to fit Porter No. 00872 standard floor sleeves for new construction. Bottom of upright shall be provided with a special molded, composite foot to protect finished floors when moving standards.

3. Upper telescoping (adjustable) upright shall be extruded from the same aluminum alloy as the bottom upright with a special rectangular configuration to eliminate rotation. Upper end of telescoping upright shall be equipped with an integral 2-1/2" (6.35cm) diameter pulley to reduce cable drag and undue tension on entire system.

4. Upper telescoping upright shall be infinitely adjustable in height by means of a special pressure locking T-handle mechanism located on the bottom upright approximately 5'-4" (1.63m) above floor level. Telescoping upright shall be counterbalanced in a static position when adjustment lock is disengaged by means of a special, constant tension spring mechanism located inside the lower upright assembly to eliminate the possibility of accidentally falling while making height adjustments. Bottom end of telescoping upright shall be equipped with special, internally mounted nylon rollers to minimize friction and wear of constant tension spring mechanism.

5. Bottom upright and telescoping upright shall be finished in a durable clear anodized finish.

6. Tensioning winch (Powr-Winch®) shall incorporate a heavy duty, self-locking ratchet mechanism with a compression, disc-brake type release mechanism to eliminate a

sudden release of the cable tension when removing net. Powr-Winch® brake mechanism shall be self-adjusting to compensate for wear. Ratchet and disc brake lock mechanism shall be completely enclosed by means of a heavy-formed steel cover. Powr-Winch® shall be furnished with a heavy, 1-3/4" (4.45cm) wide, high tensile nylon strap, and forged snap hook mechanism. Powr-Winch® furnished complete with removable handle to prevent unauthorized usage. Winch to be located on outside of upright for added player safety.

7. Standards shall consist of one reel post and one end post. Weight of each post shall not exceed 41 pounds for the reel post and 37 pounds for the end post.

8. Warranty: Provide Ten (10) year warranty on volleyball standards and three (3) year warranty on hardware. All other items shall have manufacturer's standard one year warranty.

9. Provide Porter No.2295 Net. Net shall meet the latest requirement as specified by the USVBA, NFSHSA and NAGWS. Netting shall be high quality 4" (10.2cm) square, heavy duty #36 Black Nylon Mesh with a 2" (5.1cm) wide, high quality vinyl coated polyester hem double stitched around entire perimeter of net. Top hem of net shall be furnished with a 1/8" (3.2mm) diameter (2,000 lb. minimum breaking strength) galvanized aircraft cable x 37'-6" (11.4m) long, with a nylon coating to protect against frayed cable. Ends of cable to have loops with heavy swaged type fittings for ease of installation on volleyball systems. End hems to be 6" (15.3cm) in width with a ½" (1.27cm) diameter fiberglass dowel to provide a neatly tailored, square hanging net. End hems shall also be provided with 1" (2.5cm) wide white polypropylene webbing type tension straps and special quick-adjust tension clips (three each end) for the utmost in net tension and playability.

10. Provide Porter No. 839 protective pads for each volleyball upright. Pads shall be fabricated with a firm, 1-1/4" thick protective foam (Ethafoam) interior covered in a durable, red vinyl coated polyester reinforced cover material. Each pad shall be tailored with four (4) vertical hinge arrangements to neatly fold around upright, Power-winch and all net tensioning hardware. Front side of pad shall be furnished with a 5" x 12" opening at proper height for attaching and tensioning bottom rope cable from volleyball net. Pads shall extend to a height of 5'-8" above floor and shall meet the latest requirements as prescribed by the National Federation of State High School Associations for player protection and safety.

11. Porter No.870-200 Floor Sleeve and Floorplate. Provide floor sleeve to be cast in place as indicated on drawings. Sleeve shall be 3-3/4" O.D., extending 9" into grout footing. Brass plated cover plate shall consist of an 5" O.D. x 1/2" thick recessed aluminum collar, cork gasket and brass plated cover. A special swivel retainer pin in the collar shall prevent theft. Special removal key to be included.

B. Volleyball Storage/Transport System: Manufacturer/Model: Porter No.956 Transport Cart Senoh No.DU20 Upright Storage Rack Schelde No.68106 Equipment Cart

1. Heavy duty transport frame shall be designed to store and transport six (6) sleeve-type power volleyball uprights, one (1) judge's stand with pads, three (3) nets including antennas, and three (3) sets of upright pads. Frame to be constructed of heavy wall 2-1/2" x 1-1/2" (6.3cm x 3.8cm) rectangular steel tubing. Heavy, formed steel hooks shall be provided on side diagonal frame members for storage of power volleyball standards. Hooks shall be covered in a vinyl material to protect finish on upright posts.

2. Large vinyl nylon net storage pouch shall be provided with tunnel loops and Velcro flaps for attaching to transport frame. Bottom of transport shall be equipped with a 20" x 48" (50.8cm x 121.9cm) vinyl covered storage shelf for upright pads.

3. Entire unit to roll on four (4) 3½" (8.9cm) diameter heavy-duty swivel casters. Overall size of unit (less standards) to be 4' 0-3/8" (1.23m) in length, 3' 2-1/4" (97.15cm) in height and 2' 6-1/4" (76.84cm) in width to allow transporter to pass through typical 3' wide doorways. Finish shall be durable blue powder-coat.

2.05 WALL PADDING (FIRE RETARDANT SAFETY WALL PADDING)

A. FR SAFPAD:Fire Retardant Safety Wall padding.

1. Manufacturer/Model: Porter No. 345-300. No substitutions. FR-SAFPAD™ fire retardant wall padding panels shall meet the National Fire Protection Association (NFPA 101®) life safety code requirement (6-5.3.1.2 AND 6-5.5.1)*, class A rating of 0-25 flame spread and 0-450 smoke development for use on interior wall and ceiling finishes. Wall padding shall also meet the BOCA National Building Code's Section 803.0 Interior Finish and Trim and Section 2603.0 Foam Plastic requirements. Laboratory test results must be furnished to verify that the wall pad assembly (vinyl cover, foam interior and wood backing) meets or exceeds the ASTM E-84 standard test method for surface burning characteristics of building materials (test also published as NFPA-255, UL-723, UBC 8-1 (42-1), and ANSI 2.5.) Wall pad panels not meeting proof of this test requirement will not be considered as equal.

2. Wall pad panels shall be 2'-0" wide x 6'-0" high with a 1" nailing margin top and bottom for securing panels to the wall. Panels shall be constructed with a flame retardant, 2" thick open cell neoprene foam filler with a density of 5.5 lb./ft. and an Indentation Force Deflection (IFD) of 25-45 lbs.

3. Interior foam shall be bonded to a 7/16" oriented strand wood board to minimize warping. Entire face of panel, including the 1" nailing margins, shall be upholstered in a heavy (14-oz.) fire retardant vinyl laminated, high tensile, polyester base fabric material with a leather-like embossed finish. Laminated cover available in a selection of 14 colors.

4. All cutouts in panels (electrical outlets, etc.) shall be made in the field to fit job conditions. The installation contractor shall be responsible for proper inspection and installation of panels. Installation shall be made in accordance with current factory suggested procedures

5. CODE EXCERPTS NFPA 101® LIFE SAFETY CODE – 1998 EDITION

a. 6-5.3.1.2 Textile material having a Class A rating shall be permitted on partitions that are not more than 3/4 of the floor-to-ceiling height nor more than 8 ft (2.4 m) in height, whichever is less.

b. 6-5.5.1 Products required to be tested in accordance with NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials, shall be grouped in the following classes in accordance with their flame spread and smoke development. Class A Interior Wall and Ceiling Finish. Flame spread 0-25; smoke development 0-450. Includes any material classified at 25 or less on the flame spread test scale and 450 or less on the smoke test scale. Any element thereof, when so tested, shall not continue to propagate fire.

B. Wall Attachment Clips

1. Provide Panel clips provide a wall attachment system with a smooth, neat appearance with the capability of removing the panels to allow worn or vandalized panels to be repaired or replaced by simply lifting the panel upward. Clips are

furnished in heavy, precision extruded aluminum (6063-T5) extrusions with attachment holes pre-drilled.

2. No. 00347-300 Z-Clip Channel shall be 6'-0" in length, designed for mounting either on the wall to accept the lower 1" lip on standard wall pad panels, or a snap-in type trim molding for the top lip when used in conjunction with No. 00347-100 Wall Attachment Clip. Clip is pre-drilled with 13/64" diameter holes on 9" centers when wall mounting is required.

3. No. 00347-100 Wall Attachment Clip shall be 6'-0" in length with the capability of field cutting to length as required. Clip is designed for mounting to the wall for use in combination with No. 00347-300 Z-Clip Channel Floor Molding Channel. Wall attachment clip shall be pre-drilled with 13/64" diameter holes on 9" centers for mounting to wall.

2.06 ROLL-UP GYMNASIUM DIVIDER CURTAIN

A. The 675 Curtain is available in the following configurations: Solid & Mesh (as specified below).

1. Gym divider curtain shall be bottom roll-up type wide by high and shall be in one (1) continuous section as manufactured by Porter Athletic. Lower section of curtain shall be 8’-0” high Flexivide solid vinyl, polyester reinforced 18 oz.. vinyl-coated fabric (per square yard, containing antibacterial, fungi-resistant and flame-retardant chemicals to meet requirements of ASTM E-84 Class A Rating (25 Flame Spread, 450 Smoke Development), and NFPA-701 large scale, ULC S-109 large and small scale, and State of California test requirements). Upper section of curtain shall be of Fleximesh, designed for air breathing areas in gym dividers, tennis screens or other custom air transfer applications. Fleximesh material shall be an open polyester type interlocking grid weave coated with polyvinyl chloride with an approximate 45 to 50% open area. Weight of material – 7 oz. per square yard. Flame resistant (meets California Health and Safety Code Section 13115 Large and Small Scale Test, Fed. Std. 191A, CPAI-84, NFPA 701, BIFMA F-1-78, MSHA-155). Fleximesh begins at a standard height of 8’-0” above the floor (custom heights available). Curtain may also be furnished in all-solid (Flexivide) or all-mesh (Fleximesh) if required.

2. Top of curtain shall be fabricated with a pocket to conceal a continuous 1-5/8” O.D. steel tube extending the full length of the fabric to ensure proper support. Tube shall be supported from roller support assemblies on adjustable chains not exceeding 14’-0” centers.

3. Divider curtain shall be neatly and compactly rolled on a 4-1/2” diameter batten tube concealed in the bottom section of the vinyl fabric. Rolling action shall be accomplished by means of multiple hoist belts not to exceed 25’-0” on center. Belts shall be of a heavy, industrial grade polyester fabric 5” in width. One (1) side of hoist belts shall be provided with a special friction surface, to provide rolling friction against the vinyl fabric in order to facilitate the rolling action of the bottom batten to roll the fabric compactly and to eliminate wrinkles. Opposite side of hoist belts shall be provided with a smooth surface, to allow for easy cleaning.

4. Hoist belts shall terminate on continuous zinc-plated 2-3/8” O.D. tube line shaft arrangement. Line shaft shall turn in special roller support assemblies equipped with four (4) steel ball bearing wheel rollers. Each roller support assembly shall be positioned adjacent to a hoist belt termination. Support assemblies shall be secured to structural roof framing supports by means of turnbuckles and support chains to provide structural integrity and accommodate all slopes or building camber.

5. All metal parts not zinc-plated shall be powder coated. Color as selected by Architect from standard colors.

6. Divider curtain vinyl and mesh to be low emitting and certified to meet all the requirements of the GREENGUARD Children & Schools and GREENGUARD certification program. Manufacturer to provide certificate and/or test results upon request.

B. OPTIONAL SPECIFICATIONS: Line Shaft Safety Lock (No. 10796000) – Curtain shall incorporate internal centrifugal force type lock mechanism into the line shaft to automatically lock equipment if lowering speed surpasses expected and safe velocity. Two (2) shall be required for curtains with line shafts exiting both sides of winch.

C. WARRANTY

1. 675 curtains come with a one-year limited warranty.

2. Other components may be covered by their own extended warranty.

D. COLOR OPTIONS

1. Flexivide – See SMPL00048021 – colors as selected by Architect and Owner.

2. Fleximesh – See SMPL0048022 – colors as selected by Architect and Owner.

3.00 EXECUTION

3.01 INSPECTION

A. Examine work in place on which specified work is in any way dependent to ensure that conditions are satisfactory for installation of specified work. Report in writing to the General Contractor and the Architect any defects which may influence completion of specified work. Absence of such notification will be construed as acceptance of work in place. Do not attempt installation until correct conditions are present or you have a written order to do so.

B. Equipment herein before specified shall be installed by factory trained craftsmen skilled in their trade. They shall be responsible for accurate fit of specified work.

C. Make such arrangements as are necessary to provide scaffolding to perform Work under this Section.

3.02 ERECTION

A. Coordination

1. Coordinate installation schedule with the schedules of other trades to ensure orderly and timely progress of the total Work.

2. Placement of equipment relating to floor groove lines shall be coordinated with Work under Flooring Section.

B. Basketball Backstops

1. Install in accordance with manufacturer's instructions and approved shop drawing.

2. This contractor shall adjust backstops and backboards for plumb and level.

3. This contractor shall demonstrate operation of all units to the owner or his authorized agent and adjust the UP and DOWN limits on the electric winch units.

C. Wall Pads for Basketball Backstops

1. Secure pads to block wall with 1/2” diameter galvanized machine bolt. Bolts to pass through pad and entire thickness of block wall. Bolts shall be staggered with a maximum spacing of 18" on center. Bolt holes shall be neatly drilled. After installation, fill all holes and voids completely with mortar.

2. Ceiling Sockets (Threaded): Bolt or weld to beam flange, or by anchor bolts to poured concrete slab, as required.

3. Wall Brace Flanges: Weld to both ends of brace pipe, and secure to wall pads with four 94) carriage bolts of proper size, counter-sunk from rear of wall pad.

D. Volleyball Equipment:

1. Install as detailed and as specified herein and as recommended by the respective manufacturer.

2. This contractor shall deliver floor sleeves to the General Contractor for installation as detailed and as specified herein and as recommended by the respective manufacturer.

E. Adjustments: Examine installed equipment for proper anchoring and rigidity and correct as required.

3.03 CLEANING AND TOUCH-UP

A. Thoroughly clean all items of Work in this Section. Touch-up painted members, as required for proper appearance.

3.04 DEMONSTRATION

A. Work under this Section shall include demonstrating the proper use and operation of equipment to the Owner as may be required.

END OF SECTION

SECTION 12 24 13
MOTORIZED ROLLER SHADE – INTELLIGENT WIRELESS RTS

PART 1 – GENERAL

A. SUMMARY
   1. Section Includes:
      a. RB500 Roller Shade.
   2. Related Work includes the following:
      b. Section 06 10 00 Rough Carpentry.
      c. Section 08 41 13 Aluminum-Framed Entrance and Storefront.
      d. Section 08 44 13 Glazed Aluminum Curtain Wall.
      e. Section 08 51 13 Aluminum Windows.
      f. Section 07 90 00 Joint Sealers.
      g. Section 26 00 00 Electrical.

B. REFERENCES
   1. National Fire Protection Association (NFPA) 701.
   2. Department of Transportation Motor Vehicle Safety Standard 302 Flammability of Interior Materials.
   3. California Administrative Code Title 19.
   4. Federal Standard 191 Method 5903 (used by Port Authority of New York and New Jersey for drapery, curtain, and upholstery material).
   5. Boston Fire Department Test BFD IX-1.
   6. New York State Uniform Fire Prevention and Building Code.

C. SUBMITTALS
   1. Subject under provisions of Section 01330 – Submittal Procedures.
   2. Product Data: Manufacturer's data sheets shall be submitted for each product specified, including:
      a. Preparation instructions and recommendations.
      b. Finishes, material descriptions, dimensions of individual components.
      c. Construction and installation instructions.
      d. Manufacturers recommendations for maintenance and cleaning.
   3. Drawings and Diagrams: Product details, installation details, working and assembly drawings shall be supplied as requested.
   4. Sample: Responsible contracting officer or agent shall supply one sample shade of each type specified in this contract for approval. Supplied units shall be furnished complete with all required components, mounting and associated hardware, instructions and warranty.
   5. Electric shade motors shall comply with UL standards. Copy of compliance available for submission upon request.

D. QUALITY ASSURANCE
   1. Supplier: Manufacturer, subsidiary, or licensed agent shall be approved to supply the products specified, and to honor any claims against product presented in accordance with warranty.
   2. Installer: Installer or agent shall be qualified to install specified products by prior experience, demonstrated performance and acceptance of requirements of manufacturer, subsidiary, or licensed agent. Installer shall be responsible for an acceptable installation.

3. Uniformity: Provide product of only one manufacturer for entire project.
4. Mock up: Provide one (1) mock-up shade for each roller shade type/assembly specified.

E. DELIVERY, STORAGE, AND HANDLING
1. Product shall be delivered to site in manufacturer's original packaging.
2. Product shall be handled and stored to prevent damage to materials, finishes, and operating mechanisms.

F. JOB CONDITIONS
1. Prior to shade installation, building shall be enclosed.
2. Interior temperature shall be maintained between 60 degrees Fahrenheit and 90 degrees Fahrenheit during and after installation; relative humidity shall not exceed 80%. Wet work shall be complete and dry.

G. WARRANTY
1. Provide a limited manufacturer's warranty from date of Substantial Completion covering the following periods.
   a. Lifetime Limited Warranty on all hardware components, fabrics warrantied for 5 years by Hunter Douglas, and most fabrics warrantied for 10 years by the fabric manufacturer. Specific and custom product warranties available from manufacturer or its authorized agent.

PART 2 – PRODUCTS

A. ACCEPTABLE MANUFACTURER
1. Hunter Douglas Architectural Window Coverings – 13915 Danielson Street, Suite 100, Poway, CA 92064; Phone 800.727.8953 x1; Fax 800.205.9819; Website www.hunterdouglasarchitectural.com/windowcoverings; or architect approved equivalent.
2. Request for substitutions must be approved by architect minimum of 30 days prior to close of bid.
3. Find a representative: http://www.hunterdouglasarchitectural.com/contacts/index.jsp#

B. AUTOMATED RB500 ROLLER SHADE – Intelligent Wireless RTS
1. Provide factory-assembled, shade-operator system of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with electric motor, enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements, radio control requirements and electrical characteristics with building electrical system.
   a. Standard motor lead is 18" terminating with the male end of an Anderson Quick Disconnect Plug, female J-box lead comes standard with a 102" length terminating with the female end of an Anderson Quick Disconnect Plug. Custom lengths available for the female J-box lead.
   b. 120VAC Motor to connect to power via exposed 3 wire lead, Anderson Plug (standard), or a standard household outlet 3-prong plug.
   c. 24DVC Motor to connect to power via a transformer.
   d. 12DVC Motor is powered through an internal Li-ion battery.
   e. While most motors come standard with Quieting Technology (~47 dBa), optional Ultra Quiet Technology (~38 dBA) is available in both 120VAC and 24VDC options, minimum ordered width of 45" is required.

2. FABRICS: Inherently anti-static, flame retardant, fade and stain resistant, light filtering, room darkening, and blackout fabrics providing 0% to 20% openness, 5 oz/sq. yd to 20.70 oz/sq. yd, containing fiberglass, PVC, polyester, acrylic, vinyl laminates, cotton, and vinyl coatings (based upon fabric choice). *Finish selected by architect from manufacturer's available contract colors.*
    a. Horizontal stabilizing battens are not required, nor will they be accepted.

3. CONTROL SYSTEMS:
    A. DECOFLEX Wirefree RTS Wall Switch.
        1. Single-, Two-, Three-, Four-, and Five-channel wireless transmitter.
        2. Electrical Characteristics: Battery; CR 2450 Lithium 3V.
        3. Open Air Range: 65ft radius through concrete walls 12" thick or less, or 100ft through open air.
            a. Can be expanded to 130ft range with RTS Repeater (one per range).
        4. Control Functions: Open, Close, My (stop).
        5. FCC Approval: Part 15, Class B.

C. FABRICATION
    1. Shade measurements shall be accurate to within +/- 1/8" or as recommended in writing by manufacturer.

D. FABRICS: Fabric and color to be choosen by Architect, including PVC-coated fiberglass, PVC-coated polyester, and/or PVC-free fabrics.

Part 3 – EXECUTION

A. Inspection:
    1. Subcontractor shall be responsible for inspection on site, approval of mounting surface, installation conditions, and field measurement for this work.
    2. Other interacting trades shall receive drawings of shade systems, dimensions, assembly, and installation methods from subcontractor upon request.
B. Installation:
    1. Installation shall comply with manufacturer's specifications, standard and procedures as detailed on contract drawings
    2. Adequate clearance shall be provided to permit unencumbered operation of shade and hardware.
    3. Clean finish installation of dirt and finger marks. Leave work area clean and free of debris.
C. Demonstration:
    1. Demonstrate operation method and instruct owner's personnel in the proper operation and maintenance of the roller shades.
D. Schedule:
    1. Exterior Windows.
    2. Interior Relights.

END OF SECTION

SECTION 12 49 20
MANUAL ROLLER SHADES

PART 1 – GENERAL

1.01 SCOPE

A. SUPPLIER: Furnish and install Manual Roller Shades

B. RELATED WORK SPECIFIED ELSEWHERE:

1. Section 06 10 00: Rough Carpentry

2. Section 08 51 13: Aluminum Windows

1.02 REFERENCES

A. FLAME-RESISTANT MATERIALS SHALL PASS OR EXCEED ONE OR MORE OF THE FOLLOWING TESTS:

- National Fire Protection Association (NFPA) 701 (small scale for horizontal applications)
- Department of Transportation Motor Vehicle Safety Standard 302 Flammability of Interior Materials
- California Administrative Code Title 19
- Federal Standard 191 Method 5903 (used by Port Authority of New York and New Jersey for drapery, curtain, and upholstery material)
- Boston Fire Department Teat BFD IX-1
- New York State Uniform Fire Prevention and Building Code

1.03 SUBMITTALS

A. PRODUCT DATA: Manufacturer's descriptive literature shall be submitted indicating materials, finishes, construction and installation instructions and verifying that product meets requirements specified. Manufacturers recommendations for maintenance and cleaning shall be included.

B. DRAWINGS AND DIAGRAMS: Wiring diagrams of any motorized components or units, working and assembly drawings shall be supplied as requested.

C. SAMPLE: Responsible contracting officer or agent shall supply one sample shade of each type specified in this contract for approval. Supplied units shall be furnished complete with all required components, mounting and associated hardware, instructions and warranty.

1.04 QUALITY ASSURANCE:

A. Supplier: Manufacturer, subsidiary or licensed agent shall be approved to supply the products specified, and to honor any claims against product presented in accordance with warranty.

B. INSTALLER: Installer or agent shall be qualified to install specified products by prior experience, demonstrated performance and acceptance of requirements of manufacturer, subsidiary, or licensed agent. Installer shall be responsible for an acceptable installation.

C. UNIFORMITY: Provide Manual Roller Shades of only one manufacturer for entire project.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Product shall be delivered to site in manufacturer's original packaging.

B. Product shall be handled and stored to prevent damage to materials, finishes and operating mechanisms.

1.06 JOB CONDITIONS:

A. Prior to shade installation, building shall be enclosed.

B. Interior temperature shall be maintained between 60° F. and 90° F. during and after installation; relative humidity shall not exceed 80%. Wet work shall be complete and dry.

1.07 WARRANTY:

A. Lifetime Limited Warranty. Fabrics warranted for 5 years. Specific product warranties available from manufacturer or its authorized agent.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. Hunter Douglas Architectural/ 13915 Danielson St., Ste.100/ Poway, CA 92064/ Phone: 800-727-8953 Fax: 800-205-9819/ Website: www.HDarchitectural.com, or architect approved equivalent.

B. Or approved equivalent product substitutions must be approved by architect prior to close of bid.

2.02 MANUAL ROLLER SHADES

A. PRODUCT: **Hunter Douglas "Manual Roller Shades"**

B. MATERIALS:

1. FABRICS: Inherently anti-static, flame retardant, fade and stain resistant, light filtering, room darkening, & blackout fabrics providing 0% - 15% openness factors. Fabric weights to range between 6.00 oz/sq.yd. – 20.70 oz/sq.yd. containing fiberglass, PVC, polyester, acrylic, vinyl laminates, cotton, & vinyl coatings. Finish selected by architect from manufacturer's available contract colors.

2. CONTROL SYSTEM: Adjustment-free continuous qualified #10 stainless steel ball chain ((90-lb. test)) and pulley clutch operating system allows precise control and ensures a uniform look. Clutch will develop no more than ½ pound drag for ease of lifting. Glass reinforced polyester thermopolymer (PBT) plastic components conform to military specification MIL M-24519 and designed for smooth, trouble-free operation.

3. ROLLER: Circular-shaped painted extruded aluminum tubes with thicker wall & ribs provide additional strength while locking into place the clutch & end plug. 3" outside

diameter extruded tube to have a .090 wall thickness. 2” outside diameter extruded tube to have a .072” wall thickness (1 ½” & 1 1/8” tubes have .055” wall thickness) providing strength & durability.

4. END PLUG: Heat stabilized fiber reinforced plastic outside sleeve and center shaft provide bearing surfaces on which the roller rides ensuring smooth, wear resistant operation.

5. BOTTOM ROD: Extruded aluminum weight in a Sealed Pocket Hem Bar, or Flat Bottom Bar for fabrics that are not seamable. Bottom rod is for tracking adjustments and provides uniform look.

6. MOUNTING HARDWARE: Manufacturer’s standard .07” nickel-plated, C1008/1010 cold rolled steel universal brackets including end plug bracket with lock down retainer device.

7. OPTIONS: Fascia, Top & Bottom Covers.

2.03 FABRICATION

A. Shade measurements shall be accurate to within ± 1/8” or as recommended in writing by manufacturer.

2.04 FABRICS

A. FABRIC selection from the following by Architect: (0% Openness) Avila Twilight, Edessa Twilight, Geneva Twilight, Flocke, Morocco, Pima, Sheerweave 7000, Sheerweave 7100, Sheerweave 7300 (1% Openness) GlacierScreen HD2001, GreenScreen Revive 1%, E Screen 7501,Vizela, Sheerweave 7350, Sheerweave 2701, Sheerweave 4800 (3% Openness) GlacierScreen HD1003, GlacierScreen HD2003, GreenScreen Eco, GreenScreen Revive 3%, T Screen, E Screen 7503, E Screen 7703 KoolBlack, M Screen 8503, T Screen, Sheerweave 2410, Sheerweave 2410 Performance +, Infinity2, Sheerweave 2703, Sheerweave 4400, Sheerweave 4600, Sheerweave 4650, (4% Openness) Star 2115 (5% Openness) GlacierScreen HD1005, E Screen 7505, E Screen 7705 KoolBlack, Cortina, Satine, M Screen 8505, M Screen Deco, SilverScreen, Sheerweave 2000, Sheerweave 2390, Sheerweave 2390 Performance +, Sheerweave 2705, Sheerweave 4000, Sheerweave 4500, Sheerweave 4550, Sheerweave 4700, Sheerweave 5000, (7% Openness) Siena (10% Openness) GlacierScreen HD1010, E Screen 7510, Vienne, New Orleans, Sheerweave 2100, Sheerweave 2360, Sheerweave 2710, Sheerweave 4100 (12% Openness) Natte (14% Openness) A Screen, Sheerweave 3000.

PART 3 - EXECUTION

3.01 INSPECTION:

A. SUBCONTRACTOR shall be responsible for inspection on site, approval of mounting surfaces, installation conditions and field measurement for this work.

B. OTHER INTERACTING TRADES shall receive drawings of shade systems, dimensions, assembly and installation methods from subcontractor upon request.

3.02 INSTALLATION:

A. INSTALLATION shall comply with manufacturer’s specifications, standards and procedures as detailed on contract drawings.

B. ADEQUATE CLEARANCE shall be provided to permit unencumbered operation of shade and hardware.

C. CLEAN finish installation of dirt and finger marks. Leave work area clean and free of debris.

3.03 DEMONSTRATION:

A. Demonstrate operation method and instruct owner's personnel in the proper operation and maintenance of the blinds.

3.04 SCHEDULE:

A. Provide at all neew windows.

B. EXTERIOR WINDOWS: See adrawings.

END OF SECTION

SECTION 12 63 00
GYMNASIUM BLEACHERS

1.00 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

B. Telescoping gymnasium bleachers.

1.03 RELATED WORK

A. Electrical

B. Gymnasium flooring

1.04 References:

A. 2016 California Building Code.

1.05 DESCRIPTION OF THE SYSTEM

A. The bleacher system shall be comprised of multiple tiered, closed deck seating rows operating in a telescopic manner, incorporating the most economical quantity of sections while still complying with all loading requirements.

B. The first moving row shall be secured with friction or mechanical locks. Other rows shall be mechanically locked, operable only upon unlocking and cycling the first row, quantity to be determined by Interkal engineering.

C. Each bleacher row shall be comprised of risers, seat and deck components, and a complete set of supportive columns and braces.

D. The telescopic bleacher shall incorporate a locking system permitting the use of one, several, or all rows, each locked in the extended position.

1.06 QUALITY ASSURANCE

A. Qualifications

1. Manufacturing: Manufacturer shall be regularly engaged in the design and manufacturing of telescopic seating for not less than twenty years.

2. Engineering: It will be mandatory that each bidder submit with their bid an affidavit signed by a Registered Professional Engineer stating that the product to be supplied has been tested by an independent testing facility and meets all applicable code requirements.

B. Deviations: It will be the responsibility of the bidder to furnish with their bid, a list clarifying any deviations from the specifications, written or implied. Those bidders not submitting a list of deviations will be presumed to have bid as specified.

C. Guarantees:

1. One-Year Guarantee: The manufacturer shall guarantee all work performed under these specifications to be free from defects for a period of one year.

D. Product Improvements: Seating provided shall incorporate manufacturer's design improvements and materials current at time of shipment.

1.07 SUBMITTALS

A. Submit manufacturer's installation instructions and descriptive literature in accordance with Section 01300.

B. Manufacturer's operating and maintenance manuals in accordance with Section 01 70 00.

1.08 DESIGN CRITERIA

A. Telescopic bleacher design and fabrication shall conform to comply with 2019 California Building Code and ADA requirements.

B. Telescopic gymnasium seating will be designed to support a vertical live load of 100 PSF, but not less than 120 PLF on both seat boards and footboards. Seating shall also be designed to carry a horizontal sway force of 24 PLF parallel to the seating and 10 PLF perpendicular to the seating.

C. Steel components shall be cold-formed from appropriate width strip stock conforming to ASTM A570 - Grade C 30KSI, ASTM A653- Grade 33 and 50, ASTM A500 - Grade B 46 KSI as applicable.

D. Lumber components are kiln dried, finger jointed, edge glued southern pine of grade "B & B Finish" manufactured to the current SPIB glued-laminated standards for southern pine.

E. Plywood deck boards shall be fabricated from Douglas Fir Premium Underlayment with exterior glue, 5 ply minimum, solid crossband directly under face ply, species Group 1 and manufactured in accordance with PS-1-95.

2.00 **PRODUCTS**

2.01 MANUFACTURER

A. Telescopic seating as manufactured by Interkal, Kalamazoo, Michigan, is the standard of quality required and specified herein.

2.02 MATERIALS

A. Model: Interkal, closed deck telescopic bleachers

B. Type: Wall attached

C. Quantity:

1. Provide number of banks, rows and lengths as indicated in the drawings.

D. ADA

1. Notchouts: Provide a 36” wide wheel chair space as shown on the plans and as required to meet local code jurisdiction compliance with ADA.

2. Provide access signage to comply with CBC 11B-703.

E. Dimensions:

1. Rise per row 10 -1/4”.

2. Row to row spacing 24”.

F. Propulsion:

1. Friction Power- Furnish Interkal friction power, integral automatic electro-mechanical propulsion system to open and close telescopic seating system. Operation shall assure full visual control of the seating bank. The Wide Track System incorporates two friction drive roller assemblies as an integral part of both first row vertical column assemblies. Each section of bleacher shall have a power system that shall consist of two vertical column roller assemblies which shall include two 6” diameter by 2 ½” wide cast drive wheels for a minimum of four friction roller contact points per section of bleacher. Each roller shall have a specially formulated 45-durometer rubber covering to grip the floor as the units roll in and out. The two friction drive roller assemblies shall be installed a minimum of 7-feet apart per section. The two friction roller assemblies are linked together by a continuous drive shaft driven by a 1/2 H.P. 208V, 3-phase motor that shall enable the rollers to work simultaneously, resulting in a more efficient operation with allowance for minor variations in the floor surface. All floor friction power systems shall be controlled by a dual directional, removable walk along pendant which plugs into the front of the first row to give the operator proper position for visual control. The pendant control voltage shall be 24 VAC @ less than 50 MA for the safety of all operating personnel. The entire power system shall be U.L. Recognized. A 208/220 volt 3-phase power source, including conduit, wiring, and safety disconnect must be provided by others. The electrical contractor shall perform the connections to the seating equipment at the safety disconnect. Motors, housing, and wiring shall be installed by certified personnel.

2.03 ACCESSORIES

A. Foot Level Aisles: Provide footrest level aisles at locations and sizes as shown on plans and approved shop drawings.

1. Center Aisle: Provide a permanently attached self-storing aisle rail, which is designed to eliminate all labor associated with set up and storage of the aisle rails.

2. Intermediate Steps: Provide manufacturers standard intermediate step as necessary per applicable code.

B. Last Row Closure

1. Rear Closure Board: Provide and install a properly supported, flush mounted board between the last row of the bleacher and the wall.

C. Wheelchair Seating:

1. Recoverable Notchouts: Provide manufacturers standard recoverable accessible notchout (36” wide) located as shown on architectural drawings. Notchouts to be one row or two row deep, (select one).

D. End Railing:

1. Self-Storing End Rails: Provide steel self-storing 42” high self-storing end guard rails with tubular supports and vertical intermediate members to comply with all code requirements. Rails shall be fitted to each exposed bank end from third row and above with all steel to steel connections. Finish shall be a polyester powder coat.

E. Operation:

1. Pendant Control: Provide pendant control style operation for the bleachers. Extension and retraction shall be accomplished by use of the pendant control plugged into a single receptacle.
The receptacle shall be mounted at the first row.

F. Vinyl-End Curtains:

1. Provide manufacturers standard vinyl end curtains to close off under the bleacher units in the extended position. Curtain color is to be selected from manufacturer’s standard offering.

2.04 FABRICATION

A. Continuous Wheel Channel: Wheel channels shall consist of a one piece formed steel channel welded to the base of a vertical column. Wheel channels accommodate 8 to 12 wheels per row for maximum weight distribution and operating ease. The number of wheels increases as the number of rows increase.

B. Wheels: 3-1/2” diameter with 1-1/8” non-marring soft rubber face with rounded edges designed to protect wood or synthetic floor. Provide I/2” diameter axle for all wheels

C. Columns: Electrically welded closed rectangular steel tube, 2” x 3” minimum size, 14 gauge steel fitted with a rear welded gusset at the wheel channel.

D. Row Interlocks: Join each row structure front to rear by means of two (2) interacting steel connections, plus automatic gravity row locks where Engineering determines they are required.

1. Lower: Lower track guides shall be an external superslide rod to guarantee positive engagement of vertical supports without binding and assures smooth operation over uneven floor conditions.

2. Upper: Upper track guides shall completely interlock adjacent understructure support. A welded stop to ensure correct extension of bleacher unit on deck support. Use of bolt and nut stops are not acceptable, due to risk of loosening.

E. Diagonal Braces: Structural formed steel truss fitted to rows 4 and beyond. Bracing shall be attached to the rear riser at optimum locations to insure structural integrity. Bracing will be designed and shaped to support a minimum load of 1000(lbs) of both compression and tension forces created when the bleacher is loaded.

F. Deck Supports: Shall be of structural steel, 11 gauge spaced not greater than 60” on center for maximum deck stiffness.

1. Rollers: Every deck support not attached to a vertical post will have an integral nylon roller to avoid steel to steel friction points for more efficient operation.

G. Decking: All deck boards shall consist of 19/32” nominal Douglas Fir CC grade plywood with exterior glue and solid crossbands. An extruded aluminum “H” connector shall be placed between plywood panels. Exposed wear surfaces shall be finished with a layer of high Density polyethylene plastic .025 - .030 thick, Light Gray in color, complimentary to the seat option. Deck finishes, such as clear coat, requiring more than simple touch up to restore it to a new appearance after wear occurs are unacceptable.

H. Welds: All welds shall be made at the factory by welders that are AWS certified on the equipment and process used.

I. Nose Beam: Shall be one-piece 13-gauge galvanized steel. 13-gauge steel is utilized for the necessary structural integrity to accommodate section lengths up to 26’

J. Rear Riser: Shall be one piece formed 14-gauge, grade 50, galvanized steel, with a continuous access joint to fully encapsulate footrest panel for ease of cleaning and additional structural support. 14-gauge roll formed steel is utilized for the necessary structural integrity to accommodate section lengths up to 26’.

K. Splice Plates: Each section joint shall be tied together with two structural steel members per row, employing a minimum of four steel to steel through bolt connections at the nose beam and a minimum of eight steel to steel through bolt connections at the lower steel rear riser. Gauge of splice plates to match the gauge of the nose beam and rear riser. Splice plates employing steel to plywood deck board attachments will not be acceptable. Gauge of splice plates to match the gauge of the nose beam and rear riser. In order to minimize deflections and keep rows in alignment during operation, splice connections shall transfer both axial loads (tension/compression) and bending.

L. Fasteners: All structural connections shall be made with S.A.E. grade 5 or better, stress rated bolts. The use of self-tapping bolts is not acceptable.

M. Finish:

1. Steel Understructure abraded, cleaned and finished with russet brown water base acrylic paint. Steel risers and nose beams finished with corrosion resistant silver gray matte finish with galvanized alloy plating.

2. Zinc plated (optional for high humidity areas).

2.05 SEAT OPTIONS

A. Sculpture Seat Modules:

1. 18-inch wide one-piece individual seating modules shall be constructed of high-density polyethylene. Provide in 12” deep.

2. Each module shall have two longitudinal and five transverse internal ribs to provide additional structural integrity and resistance to impact.

3. Each module shall have a full ½” interlock to the adjacent module both around the perimeter and along the internal ribs to eliminate pinching hazards and assures proper alignment.

4. A steel-to-steel attachment of each module to a minimum 14 gauge galvanized steel nosebeam shall be provided for maximum rigidity. All such mounting hardware shall be concealed.

5. End caps shall be provided at the ends of each bank of seating as well as at each aisle.

6. Each module shall have a recessed area for optional seat numbering.

7. Select from manufacturers15 standard solid colors.

3.00 **EXECUTION**

3.01 INSPECTION

A. Verify that areas to receive telescopic bleachers are free from impediments interfering with installation.

B. Do not begin work until building conditions are satisfactory.

3.02 INSTALLATION

A. Install telescopic bleachers in accordance with manufacturer's instructions and approved submittal drawings.

B. Adjust bleachers for smooth and proper operation.

C. Clean bleachers and remove all debris from gymnasium resulting from installation.

END OF SECTION

SECTION 14 21 00
ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Electric Traction Elevators.

B. Products Supplied but Not Installed Under this Section:

1. Hoist Beam

2. Pit Ladder

3. Inserts mounted in block walls for rail attachments

C. Work Supplied Under Other Sections:

1. Temporary lighting, including temporary lighting in hoistway for machine space with switch located in hoistway on the strike jamb side of top landing door.

2. Main line disconnects for each elevator.

a. One fused three phase permanent power in building electrical distribution room

3. Hoistway ventilation shall be in accordance with local and national building code requirements.

4. Guide Rail Support shall be structurally adequate to extend from pit floor to top of hoistway, with spans in accordance with requirements of authority having jurisdiction and final layouts.

5. Removable barricades at all hoistway openings, in compliance with OSHA 29 CFR 1926.502 in addition to any local code requirements.

6. Lifeline attachments capable of withstanding 5000 lb load in accordance with OSHA 29 CFR 1926.502. Provide a minimum of 2 at the top, front of each hoistway.

7. Pit lighting: Fixture with switch and guards. Provide illumination level equal to or greater than that required by ASME A17.1/CSA B44 2000, or applicable version.

8. Control space lighting with switch. Coordinate switch with lighting for machine space as allowable by code.

D. Related sections:

1. Section 01 50 00 – Temporary Facility and Controls

2. Section 03 30 00 - Cast-in-Place Concrete:

3. Section 04 20 00 - Unit Masonry

4. Section 05 50 00 - Metal Fabrications

5. Section 07 16 00 - Cementitious Waterproofing

6. Section 23 00 00 - Heating, Ventilating, and Air Conditioning

7. Section 26 00 00 - Electrical

8. Section 26 30 00 - Electric Power Generating and Storing Equipment

9. Section 27 30 00 - Voice Communications

10. Section 28 31 00 - Fire Detection and Alarm

11. Section 31 00 00 – Earthwork

E. Industry and government standards:

1. ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities

2. ADAAG - Accessibility Guidelines for Buildings and Facilities

3. ANSI/NFPA 70, National Electrical Code

4. ANSI/NFPA 80, Standard for Fire Doors and Fire Windows

5. ASME/ANSI A17.1, Safety Code for Elevators and Escalators.

1.2 DESCRIPTION OF ELEVATOR

A. Elevator Equipment: MonoSpace® 300 gearless traction elevator

B. Equipment Control: KCM831

C. Drive: Non Regenerative

D. Quantity of Elevators: 1 Elevator

E. Landings: 2

F. Openings: 2 Front Openings, 0 Back Openings

G. Travel: 13’ 4”

H. Rated Capacity: 3,500 lb

I. Rated Speed: 150 FPM

J. Clear Inside Dimensions: (W x D) 6' 5 11/16" x 5' 6 11/16"

K. Cab Height: 7'-6"

L. Clear height under suspended ceiling: 7'-4"

M. Entrance Width and Type: 42" and Left Opening

N. Entrance Height: 7'-0"

O. Main Power Supply: 480 V Volts + 5%, three-phase

P. Operation: Simplex

Q. Machine Location: Inside the hoistway mounted on car guide rail

R. Control Space Location: Adjacent room

S. Elevator Equipment shall conform to the requirements of seismic zone: Seismic

T. Maintenance Service Period: 12 Months

1.3 PERFORMANCE REQUIREMENTS

A. Car Performance

1. Car Speed ± 5% of contract speed under any loading condition or direction of travel.

2. Car Capacity: Safely lower, stop and hold (per code) up to 125% of rated load.

B. System Performance

1. Vertical Vibration (maximum): ISO 18738/ISO 8041 system pk-pk 15 mg
2. Horizontal Vibration (maximum): ISO 18738/ISO 8041 system pk-pk 12 mg

3. Jerk Rate (maximum): 1 m/s^3

4. Acceleration (maximum): 0.4 m/s^2

5. In Car Noise: 55 dB(A) Maximum

6. Leveling Accuracy: ±0.2 inches

7. Starts per hour (maximum): 180

1.4 SUBMITTALS

A. Comply with Section 01 33 00 - Submittal Procedures.

B. Product Data: Submit manufacturer's product literature for each proposed system.

1. Cab design, dimensions and layout.

2. Layout, finishes, and accessories and available options.

3. Controls, signals and operating system.

4. Color selection charts for cab and entrances.

C. Shop Drawings:

1. Clearances and travel of car.

2. Clear inside hoistway and pit dimensions.

3. Location and layout of equipment and signals.

4. Car, guide rails, buffers and other components in hoistway.

5. Maximum rail bracket spacing.

6. Maximum loads imposed on building structure.

7. Hoist beam requirements.

8. Location and sizes of access doors.

9. Location and details of hoistway door and frames.

10. Electrical characteristics and connection requirements.

D. Operation and maintenance data:

1. Provide manufacturer's standard maintenance and operation manual.

E. Diagnostic Tools

1. Prior to seeking final acceptance for the completed project as specified by the Contract Documents, the Elevator Contractor shall deliver to the Owner any specialized tool(s) that may be required to perform diagnostic evaluations, adjustments, and/or parametric software changes and/or test and inspections on any piece of control or monitoring equipment installed.

This shall include any specialized tool(s) required for monitoring, inspection and/or maintenance where the means of suspension other than conventional wire ropes are furnished and installed by the Elevator Contractor. Any and all such tool(s) shall become property of the Owner. Any diagnostic tool provided to the Owner by the Elevator Contractor shall be configured to perform all levels of diagnostics, systems adjustment and parametric software changes which are available to the Elevator Contractor.

In those cases where diagnostic tools provided to the Owner require periodic recalibration/or re-initiation, the Elevator Contractor shall perform such tasks at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the competed project During those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation, or repair, the Elevator Contractor shall provide a temporary replacement for the tool at no additional cost to the Owner.

The Elevator Contractor shall deliver to the Owner, printed instructions for the proper use of any tool that may be necessary to perform diagnostic evaluations, system adjustment, and/or parametric software changes on any unit of microprocessor-based elevator control equipment and means of suspension other than standard elevator steel cables furnished and install by the Elevator Contractor.
Accompanying the printed instructions shall be any and all access codes, password, or other proprietary information that is necessary to interface with the microprocessor-control equipment.

1.5 QUALITY ASSURANCE

A. Manufacturer: Minimum of fifteen years' experience in the fabrication, installation and service of elevators of the type and performance of the specified. The manufacturer shall have a documented quality assurance program.

B. Installer: The equipment manufacturer shall install the elevator.

C. Inspection and Testing: In accordance with requirements of local jurisdiction, obtain required permits, inspections and tests.

1.6 DELIVERY, STORAGE AND HANDLING

A. If the construction site is not prepared to receive the elevator equipment at the agreed ship date, the General Contractor shall be responsible for the cost of storage at an approved facility. Additional labor costs for double handling will be the responsibility of the General Contractor.

B. Delivered elevator materials shall be stored in a protected environment in accordance with manufacturer recommendations. A minimum storage area of 10 feet by 20 feet is required adjacent to the hoistway.

1.7 WARRANTY

A. Provide manufacturer warranty for a period of one year. The warranty period is to begin upon final acceptance of the Contract. Warranty covers defects in materials and workmanship. Damage due to ordinary use, vandalism, improper or insufficient maintenance, misuse, or neglect do not constitute defective material or workmanship.

1.8 MAINTENANCE SERVICE

A. The elevator manufacturer shall provide maintenance service consisting of regular examinations and adjustments of the elevator equipment for a period of 12 Months after date of final acceptance.

Predictive maintenance shall be included for the full maintenance period. This service must be capable of using AI-based analytics to identify potential equipment issues and notifying the elevator provider via an internet connection.

Replacement parts shall be produced by the original equipment manufacturer.

B. Maintenance service to be performed during regular working hours of regular working days and shall include emergency call back service during regular working hours.

C. Maintenance service shall not include adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Provide AC gearless machine room-less elevator systems subject to compliance with the design and performance requirements of this specification. Elevator manufacturers may include but are not limited to one of the following:

1. Basis of Design: MonoSpace® 300 traction elevators by KONE, Inc. (www.kone.com).

2. Other acceptable machine room-less products: manufacturer with minimum 15 years' experience in manufacturing, installing, and servicing elevators of the type required for the project.

2.2 EQUIPMENT: CONTROL COMPONENTS AND CONTROL SPACE

A. Controller: Provide microcomputer-based control system to perform all functions.

1. All high voltage (110V or above) contact points inside the controller cabinet shall be protected from accidental contact in a situation where the controller doors are open.

2. Controller shall be separated into two distinct halves; Motor Drive side and Control side. High voltage motor power conductors shall be routed and physically segregated from the rest of the controller.

3. Provide a serial cardrack and main CPU board containing a non- erasable EPROM and operating system firmware.

4. Variable field parameters and adjustments shall be contained in a non- volatile memory module.

B. Drive: Provide Variable Voltage Variable Frequency AC drive system to develop high starting torque with low starting current.

C. Controller Location: Locate controller{s} in the front wall integrated with the top landing entrance frame, machine side of the elevator. One non-fused three phase permanent power in hoist way at top landing. A separate control space should not be required.

2.3 EQUIPMENT: HOISTWAY COMPONENTS

2.4 EQUIPMENT: HOISTWAY ENTRANCES

A. Hoistway Entrances

1. Sills: Extruded Aluminum.

2. Doors: Hollow metal construction with vertical internal channel reinforcements.

3. Fire Rating: Entrance and doors shall be UL fire-rated for 1-1/2 hour.

4. Entrance Finish: Brushed Stainless Steel.

5. Entrance Markings Jamb Plates: Provide standard entrance jamb tactile markings on both jambs, at all floors. Plate Mounting: Refer to manufacturer drawings.

2.5 EQUIPMENT: CAR COMPONENTS

A. Car Frame: Provide car frame with adequate bracing to support the platform and car enclosure.

B. Car Safeties: Device will be provided and mounted under the car platform, securely bolted to the Car Frame. The safety will be actuated by a centrifugal governor mounted at the top of the hoistway. The Safety is designed to operate in case the car attains excessive descending speed.

C. Platform: Platform shall be all steel construction.

D. Car Guides: Provide guide-shoes mounted to top and bottom of both car and counterweight frame. Each guide-shoe assembly shall be arranged to maintain constant contact on the rail surfaces. Provide retainers in areas with Seismic design requirements.

E. Car Wall Finish:

1. Side Walls: Asian Night Laminate (L418)

2. Rear Wall: 441 Brushed Stainless Steel (4SS)

3. Car front, Door and Skirting: Brushed Stainless Steel

4. Ceiling: Round, LED spotlights

5. Handrails: Brushed Stainless Steel

a. Rails to be located on of car enclosure.

6. Sills: Aluminum extruded.

F. Cab Wall Protection Pads to be included

G. Flooring: By others. (Not to exceed 3lb/sqft and 1/2" finished depth.)

H. Emergency Car Signals

1. Emergency Siren: Siren mounted on top of cab that is activated when the alarm button in the car operating panel is engaged. Siren shall have rated sound pressure level of 80 dB(A) at a distance of three feet from device. Siren shall respond with a delay of not more than one second after activation of alarm button.

2. Emergency Car Lighting: Provide emergency power unit employing a 12- volt sealed rechargeable battery and totally static circuits shall illuminate the elevator car and provide current to the alarm bell in the event of building power failure.

3. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.

I. Ventilation: Manufacturer’s standard cab fan

2.6 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

A. Car Operating Panel: Provide car operating panel with all push buttons, key switches, and message indicators for elevator operation. Fixture finish to be Brushed Stainless Steel

1. Main Flush mounted car operating panel shall contain a bank of round, mechanical, illuminated buttons marked to correspond to landings served, emergency call button, door open button, door close button, and key switches for lights, inspection, and exhaust fan. Buttons have Amber Dot Matrix illumination (halo). All buttons to have raised text and Braille marking on left hand side. The car operating display panel shall be Amber Dot Matrix. All texts, when illuminated, shall be Amber Dot Matrix. The car operating panel shall have a Brushed Stainless Steel finish.

2. Additional features of car operating panel shall include:

   a. Car Position Indicator within operating panel Brushed Stainless Steel

   b. Elevator Data Plate marked with elevator capacity and car number on car top.

   c. Help buttons with raised markings.

   d. In car stop switch per local code.

   e. Call Cancel Button.

B. Hall Fixtures: hall fixtures shall be provided with necessary push buttons and key switches for elevator operation. hall fixtures shall have a Brushed Stainless Steel finish.

   1. Hall fixtures shall feature round, mechanical, buttons in applied mount face frame. Hall fixtures shall correspond to options available from that landing. Buttons shall be in a vertically mounted fixture.

C. Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel, and a chime will sound. The chime will sound once for up and twice for down. The car riding lantern face plate shall have a Brushed Stainless Steel finish.

2.7 EQUIPMENT: ELEVATOR OPERATION AND CONTROLLER

A. Elevator Operation

   1. Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.

   2. Zoned Car Parking.

   3. Relative System Response Dispatching.

B. Standard Operating Features to include:

   1. Full Collective Operation

   2. Fan and Light Control.

   3. Load Weighing Bypass.

4. Ascending Car Uncontrolled Movement Protection

5. Top of Car Inspection Station.

C. Additional Operating Features to include:

1. Car Wall Protection Pads

D. Elevator Control System for Inspections and Emergency

1. Provide devices within controller to run the elevator in inspection operation.

2. Provide devices on car top to run the elevator in inspection operation.

3. Provide within controller an emergency stop switch to disconnect power from the brake and prevents motor from running.

4. Provide the means from the controller to mechanically lift and control the elevator brake to safely bring car to nearest available landing when power is interrupted.

5. Provide the means from the controller to reset the governor over speed switch and also trip the governor.

6. Provide the means from the controller to reset the emergency brake when set because of an unintended car movement or ascending car over speed.

7. Provide the means for the control to reset elevator earthquake operation.

2.8 EQUIPMENT: DOOR OPERATOR AND CONTROL

A. Door Operator: A closed loop permanent magnet VVVF high-performance door operator shall be provided to open and close the car and hoistway doors simultaneously. Door movement shall be cushioned at both limits of travel. Electro-mechanical interlock shall be provided at each hoistway entrance to prevent operation of the elevator unless all doors are closed and locked. An electric contact shall be provided on the car at each car entrance to prevent the operation of the elevator unless the car door is closed.

B. The door operator shall be arranged so that, in case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in accordance with applicable code. Emergency devices and keys for opening doors from the landing shall be provided as required by local code.

C. Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or immediately upon pressing of a car button. A door open button shall be provided in the car. Momentary pressing of this button shall reopen the doors and reset the time interval.

D. Door hangers and tracks shall be provided for each car and hoistway door. Tracks shall be contoured to match the hanger sheaves. The hangers shall be designed for power operation with provisions for vertical and lateral adjustment. Hanger sheaves shall have polyurethane tires and pre-lubricated sealed-for-life bearings.

E. Electronic Door Safety Device. The elevator car shall be equipped with an electronic protective device extending the full height of the car. When activated, this sensor shall prevent the doors from closing or cause them to stop and reopen if they are in the process of closing. The doors shall remain open as long as the flow of traffic continues and shall close shortly after the last person passes through the door opening.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Field measure and examine substrates, supports, and other conditions under which elevator work is to be performed.

B. Do not proceed with work until unsatisfactory conditions are corrected.

C. Prior to start of work, verify hoistway is in accordance with shop drawings. Dimensional tolerance of hoistway from shop drawings: -0 inches +2 inches. Do not begin work of this section until dimensions are within tolerances.

D. Prior to start of work, verify projections greater than two inches (four inches if ASME A17.1/CSA B44 2000 applies) must be beveled not less than 75 degrees from horizontal.

E. Prior to start of work, verify landings have been prepared for entrance sill installation. Traditional sill angle or concrete sill support shall not be required.

F. Prior to start of work, verify elevator pit has been constructed in accordance with requirements, is dry and reinforced to sustain vertical forces, as indicated in approved submittal. Verify that sumps or sump pumps located within pit will not interfere with installed elevator equipment.

G. Prior to start of work, verify control space has been constructed in accordance with requirements, with access coordinated with elevator shop drawings, including sleeves and penetrations.

H. Verify installation of GFCI protected 20-amp in pit and adjacent to each signal control cabinet in control space.

3.2 PREPARATION

A. Coordinate installation of anchors, bearing plates, brackets and other related accessories.

3.3 INSTALLATION

A. Install equipment, guides, controls, car and accessories in accordance with manufacturer installation methods and recommended practices.

B. Properly locate guide rails and related supports at locations in accordance with manufacturer's recommendations and approved shop drawings. Anchor to building structure using isolation system to minimize transmission of vibration to structure.

C. All hoistway frames shall be securely fastened to fixing angles mounted in the hoistway. Coordinate installation of sills and frames with other trades.

D. Lubricate operating system components in accordance with manufacturer recommendations.

E. Perform final adjustments, and necessary service prior to final acceptance.

3.4 CONSTRUCTION

A. Interface with Other Work:

1. Guide rail brackets attached to steel shall be installed prior to application of fireproofing.

2. Coordinate construction of entrance walls with installation of door frames and sills. Maintain front wall opening until elevator equipment has been installed.

3. Ensure adequate support for entrance attachment points at all landings.

4. Coordinate wall openings for hall push buttons, signal fixtures and sleeves. Each elevator requires sleeves within the hoistway wall.

5. Coordinate emergency power transfer switch and power change pending signals as required for termination at the primary elevator signal control cabinet in each group.

6. Coordinate interface of elevators and fire alarm system.

7. Coordinate interface of dedicated telephone line.

3.5 TESTING AND INSPECTIONS

A. Perform recommended and required testing in accordance with authority having jurisdiction

B. Obtain required permits and provide originals to Owner's Representative.

3.6 DEMONSTRATION

A. Prior to final acceptance, instruct Owner's Representative on the proper function and required daily maintenance of elevators. Instruct personnel on emergency procedures.

END OF SECTION

SECTION 22 00 00
PLUMBING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Related Documents:

1. The other Contract Documents complement the requirements of this Section and apply to this Section
2. Division 1 - General Requirements, General Mechanical Section 23 00 13 and General Commissioning Section 01 91 13 apply to the Work of this Section.
3. Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

B. Codes and Regulations:

1. California Plumbing Code (CPC).
2. California Mechanical Code (CMC).
3. California Building Code (CBC).
4. California Green Building Standards Code(CGBSC).
5. California Electrical Code (CEC).
6. California Fire Code (CFC).
7. National Fire Code (NFC).
8. National Fire Protection Association (NFPA).
9. Local Building Department.
10. Local Fire Marshal.
11. California Energy Commission.
12. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Architect.

C. Scope of Work: (Plumbing Section Division 22)

1. Material and labor including rough-in for and connection to fixtures, appliances and equipment are:
    a. WASTE AND VENT
        1. Drain waste and vent piping (DWV)
        2. Indirect waste piping
        3. Chemical wastes and vents.
        4. Floor drains.
        5. Traps.
        6. Vent flashings.
        7. Interceptors and separators.
        8. Insulation of piping for condensation, heat, sound, and vibration.

b. STORM DRAINAGE

1. Roof and overflow drains, including flashing, rainwater drainage piping. Exterior rainwater leader downspouts (10 gauge and heavier).

c. WATER

1. Potable water piping systems including relief valves, balancing valves, water hammer shock absorbers.
2. Isolation, Zone and Control Valves.
3. Hot water systems including heaters and storage tanks.
4. Tempered water systems.
5. Chilled drinking water systems.
6. Hot water circulating pumps.
7. Gravity pressure tanks with controls.
8. Water filters and strainers.
9. Piping for water service.
10. Backflow preventers.
11. Disinfecting of water systems.
12. Insulation of piping and equipment for heat, sound, and vibration.

d. KITCHEN

1. Ovens (natural gas fired)
2. Sinks and dishwashers.
3. Ice makers
4. Coffee makers
5. Garbage disposers.
6. Water filters.
7. All other equipment with piping connections including kitchen unit combinations specified by food service consultant.

e. ALL PLUMBING FIXTURES AND SUPPORTS

1. Including, but not limited to:
   (a) Sinks, lavatories, water closets, urinals, service sinks, etc., - all materials
   (b) Shower pans, shower receptors, and shower stalls
   (c) Supports (backing) for all plumbing fixtures and accessories
   (d) Installation of sinks in or part of drainboards - all materials

f. FUEL GAS PIPING

1. Natural gas distribution, meters, regulators and connections to all gas fired equipment.

g. PIPE IDENTIFICATION – Refer to Section 23 0013

COASTAL CHRISTIAN SCHOOL

h. CONNECTIONS

1. Utilities-Sanitary sewer, storm drain, water, gas
2. Hot water tanks
3. Temporary water, waste and air lines
4. The joining of pipe by any mode or method including, but not limited to, acetylene and arc welding, brazing, lead burning, plastics welding, soldering, wiped joints, caulked joints expanded or rolled joints, etc., used in connection with any of the work listed herein.

i. LAYOUT AND CUTTING

1. Holes, chases, channels, the setting and erection of bolts, inserts, stands, brackets, stanchions, supports, sleeves, escutcheon plates, thimbles, hangers, conduits, and boxes.

j. EXCAVATION, TRENCHING AND BACKFILL

1. In connection with plumbing and piping work shown herein

k. TEMPORARY PIPING in connection with:

1. Building and construction work
2. Excavating and underground construction
3. Demolition work

l. PIPE HANGERS, SUPPORTS, ANCHORS, GUIDES, EXPANSION JOINTS

1. Including:
   (a) Supports for equipment to which pipe is connected, such as tank supports
   (b) Acoustical pipe isolation
   (c) Isolators-dielectric and vibration
   (d) Anchors and thrust blocks of concrete, metal, etc.
   (e) Seismic bracing
      (1) Anvil/Badger, Mason Industries, B-Line/TOLCO or approved equal.
      (2) Seismic hanger system design shall comply with current CBC requirements and ASE 7-05 and 7-10.

m. SIGNS AND NOTICES

n. SHEET LEAD, FIBERGLASS AND/OR PLASTIC LINING FOR:

1. Shower stalls
2. Tanks, vats, sinks and troughs
3. Roof flashing for pipe

o. MECHANICAL EQUIPMENT-GAS FIRED

p. ROOF FLASHINGS FOR PIPING PENETRATIONS

q. TESTS

1. Piping, for tightness
2. Equipment for performance
3. Operating instructions
4. Final operation

1.2 ACCESSIBLE PLUMBING FIXTURES

A. Accessible plumbing fixtures shall comply with all requirements of CBC Sections 11B-213, 11B-305, & 11B-308, & 11B-Division 6.

1.3 QUALITY ASSURANCE

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

B. Without additional cost to the Owner, provide such other labor and materials as are required to complete the Work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

C. Welder's Qualifications: Comply with ASME B31.8. The pipe welder shall have a copy of a certified ASME B31.8 qualification test report. Contractor shall also conduct a qualification test. Submit each welder's identification symbols, assigned number, or letter, used to identify work of the welder. Affix symbols immediately upon completion of welds. Welders making defective welds after passing a qualification test shall be given a requalification test and, upon failing to pass this test, shall not be permitted to work this contract.

D. All grooved couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.

1. All castings used for couplings housings, fittings, or valve and specialty bodies shall be date stamped for quality assurance and traceability.

E. Comply with NSF 14, "Plastics Piping System Components and Related Materials," for plastic, potable domestic water piping and components. Include marking "NSF-pw" on piping.

F. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.

G. Comply with NSF 372, “Drinking Water System Components – Lead Content” for potable domestic water piping and components.

H. When using CPVC piping, installing contractor shall review all materials that may come into contact with the CPVC piping system whether thru the course of construction/installation or at the final/completed installation with the Lubrizol FBC System Compatible Program to ensure ‘compatibility’. Contractor to review and/or register for updates at www.systemcompatible.com or contact manufacturer's representative for further information.

I. When Corzan® HP / Corzan® or FlowGuard Gold® CPVC pipe is installed, all installers shall be trained by manufacturer of the material (or as directed by Manufacturer) as to the correct installation/assembly procedures. Training shall be documented.

1.4 SUBMITTALS

A. Comply with pertinent provisions of Architectural Division 1 Sections.

B. Product Data: Within 35 calendar days after the Contractor has received the Notice to Proceed, submit 1 electronic PDF copy of the following to the Architect for approval prior to acquisition:

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications, catalog cuts, and other data needed to prove compliance with the specified requirements. All pieces of equipment shall be clearly identified on corresponding manufacturer's literature being submitted.
3. Shop Drawings or other data as required to indicate method of installing and attaching equipment, except where such details are fully shown on the Drawings.
4. Submittals for the entire project shall be submitted at the same time or may be rejected until all are included in one submittal package.
5. Submittals shall be provided electronically in PDF format, bookmarked by design tags for equipment and specification sections for materials. Incomplete or noncompliant submittals may be rejected.

1.5 DESIGN CHANGES CAUSED BY PRODUCT SUBSTITUTIONS

A. Contractor shall pay costs of design and installation for changes resulting from substitution of alternate products.

B. Acceptance of alternate products by Architect does not change this requirement.

1.6 PRODUCT HANDLING

A. Comply with pertinent provisions of Architectural Sections.

B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

PART 2 - PRODUCTS

2.1 WASTE, VENT, SEWER AND STORM DRAINAGE

A. Above Grade (especially within building areas where sound transmission is of concern)

1. All waste, vent, sewer and storm lines shall be of cast iron soil pipe and fittings and shall conform to the requirements of CISPI Standard 301, ASTM A-888 or ASTM A-74 for all pipe and fittings

a. Acceptable Manufacturers:

1. AB&I Foundry
2. Charlotte Pipe and Foundry
3. Tyler Pipe Company

b. Couplings

1. Standard Couplings: for hubless pipe and fittings shall conform to the manufacturer's installation instructions and local code requirements. Hubless coupling gaskets shall conform to ASTM Standard C-564.
2. Heavy Duty Couplings: for hubless pipe and fittings shall conform to the manufacturer’s installation instructions and local codes requirements. Hubless couplings gaskets shall conform to ASTM C 1540 and FM 1680 Class 1. Couplings shall consist of a 304

stainless steel shields, clamp assembly and a high quality elastomeric gasket conforming to ASTM 564. Clamp shall be 4 band construction, Clamp-All, Tyler 4000 or approved equal.

3. Joints for hub and spigot pipe shall be installed with compression gaskets conforming to the requirements of ASTM Standard C-564 or shall be installed with lead and oakum.

c. Mandatory Referenced Standards

1. Cast Iron Soil Pipe Institute Standard Specifications - Latest Issue

(a) CISPI 301: Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

(b) CISPI 310: Couplings for use in connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

2. ASTM Standard Specifications - Latest Issue

(a) A-888: Standard Specifications for Hubless Cast Iron Soil Pipe and Fittings.

(b) A-74: Standard Specifications for Hub and Spigot Cast Iron Soil Pipe and Fittings.

(c) C-564: Standard Specifications for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

B. Above Grade (Vent) and Below Grade (Drain and Waste):

1. Schedule 40 Solid wall PVC plastic DWV pipe with solvent-cemented drainage pattern fittings complying with ASTM D 1785 - Latest Issue.

a. SCH. 40 Cellular Core PVC plastic DWV pipe with solvent-cemented drainage pattern fittings complying with ASTM D 4396 may be used at Contractor's option for vent piping. -Latest Issue.

2. Schedule 40 Solid wall ABS plastic DWV pipe with solvent-cemented fittings complying with ASTM D-2661 - Latest Issue.

a. SCH. 40 Cellular Core ABS plastic DWV pipe with solvent-cemented drainage pattern fittings complying with ASTM D 3965 may be used at Contractor's option for vent piping. -Latest Issue.

C. Condensate (sized per CMC) and indirect waste drains

1. Type M Copper Water Tube ASTM B88 with wrought Copper solder fittings, ANSI-B16.22

2. PVC Schedule 40 Plastic Pipe and fittings, Solvent Cement Joints ASTM D 1785 or D2241. ASTM D2464, D2466 or D2467. For condensing furnaces and heating equipment only.

2.2 DOMESTIC WATER PIPING

A. Below Grade (Water Service)

1. 3" NPS and smaller, Schedule 40 PVC Plastic Pipe and fittings. ASTM D1785, D2466, with Solvent Cement Joints ASTM D2564.

2. 2" NPS and smaller, Type K Soft Annealed Temper Copper Tube ASTM B88 with Wrought Copper pressure fittings, ANSI B16.22. SIL-FOS - High temperature Brazing Metal Filler.
3. 4" NPS and larger, PVC AWWA C900 Class 100 Plastic Pipe with Dutile-Iron fittings AWWA C110, C111 or Elastomeric Gasket Joints

B. Above Grade (Distribution System)

1. Piping
   a. For soldered, brazed and mechanical joints, 4" and smaller Copper Water Tube Type L Annealed Temper (Hard Drawn) ASTM B75 or ASTM B88.
2. Fittings
   a. Wrought Copper Pressure Solder Fittings, ASME B16.22 or ASME B16-25, 95-5 Tin-Antimony Filler Metal.
   b. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
   c. Copper Unions: MSS SP-123, cast-copper alloy, hexagonal-stock body, with ball-and-socket, met-to-metal seating surfaces, and solder-joint or threaded ends.
   d. Press Fitting: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM. Press fittings shall have an inboard bead design.
      1. Copper Press Fittings: Viega/Rigid Tool Company, NIBCO, Elkhart/Apollo Xpress or approved equal.
      2. 2"NPS and smaller: Wrought copper fitting with EPDM-rubber O-ring seal in each end.
      3. 2-1/2" to 4"NPS: Cast-bronze or wrought copper fitting with EPDM-rubber O-ring seal in each end.
   e. Grooved-Joint Copper-Tube Appurtenances:
      1. Basis of Design Product: Subject to compliance with requirements, provide a comparable product by one of the following manufacturers:
         (a) Anvil International
         (b) Shurjoint Piping Products
         (c) Victaulic Company
      2. Copper Grooved-End Fittings: ASME B16.22 wrought copper and ASTM B75 copper tube or ASME B16.18 and ASTM B 584 bronze castings. Manufactured to copper-tube dimensions. (Flaring of tube or fitting ends to accommodate alternate sized couplings is not permitted.) Basis of Design: Victaulic Copper Connection.
      3. Grooved-End-Tube Couplings: Copper-tube dimensions and design similar to AWWA C606. Include ferrous housing sections cast with offsetting angle-pattern bolt pads, EPDM-rubber center-leg gaskets suitable for hot and cold water with pipe stop to ensure proper groove engagement, alignment, and pipe insertion depth, and ASTM A449 compliant bolts and nuts. Installation-

Ready™ for complete installation without field disassembly. Basis of Design: Victaulic Style 607.

f. Installation- Ready™ fittings for grooved end copper tubing shall be manufactured to copper-tube dimensions, ductile iron conforming to ASTM A-536, Grade 65-45-12, with Installation-Ready™ ends, PVDF (Poly Vinylidene Fluoride) and Grade “EHP” EPDM-HP [Grade ‘T’ Nitrile] gasket, and ASTM A449 electroplated steel bolts and nuts, rated to 300 psi (2065 kPa) with Type K or L Copper Tubing.

g. All underground water piping within the building boundaries shall be ASTM B88-93a Type "L" annealed (soft) copper tube made up without fittings below the floor level.

2.3 CPVC WATER PIPING OPTION (PROVIDE AS SEPARATE LINE ITEM IN BID)

A. Above Grade (Distribution System)

1. 2" and smaller – FlowGuard Gold® CTS CPVC pipe and fittings per ASTM D2846, compound material shall meet cell class rating of 24448 as defined by ASTM D1784 and shall be certified by NSF International for use in potable water systems.

   a. Flow Guard Gold® CTS pipe/fittings may be used for underground/underslab applications, follow manufacturers installation recommendations and ASTM D2774 for Underground Installation of Thermoplastic Pressure Pipe.

   b. Flow Guard Gold® material shall meet the flame spread / smoke developed rating of 25/50 as tested in accordance with ASTM E84, and shall be tested empty and have third party test/certification data available confirming material meets the 25/50 requirement.

2. 2-1/2" and larger to be schedule 80 IPS Corzan® HP (Corzan® for pipe 10” and larger as may be necessary) pipe and fittings – The pipe compounds shall meet cell class rating of 24448 for piping up to 8” size and a cell class rating of 23447 for piping larger than 8” and all fittings as defined by ASTM D1784. Piping shall be NSF International certified for potable water use, CPVC pipe and fittings shall also conform to the following:

   a. Pipe shall meet or exceed the requirements of ASTM F441 in schedule 80 IPS.

   b. Corzan® HP / Corzan® CPVC schedule 80 pipe/fittings shall carry a pressure rating as listed by Plastics Pipe Institute (PPI). This Corzan® HP / Corzan® CPVC schedule 80 IPS compound shall be pressure rated in accordance with ASTM D2837 and PPI – TR-3 and have a hydrostatic design bases of 4,000 psi at 72ºF and 1,000 psi at 180 ºF as listed in PPI publication TR-4.

      1. Schedule 80 – Socket type fittings shall meet or exceed the requirements of ASTM F439.

      2. Schedule 80 – Threaded type fittings shall meet or exceed the requirements of ASTM F437.

B. Victaulic Company PGS-300 CPVC Piping system may be used on water services where IPS size Schedule 80 CPVC pipe is approved for use. Pipe and fittings shall be cut grooved to Victaulic’s PGS-300 groove specification. Schedule 80 CPVC pipe shall meet the requirements of ASTM F441 and ASTM D1784 - minimum cell classification 23447 Pipe.

2.4 GAS PIPING

A. Below Ground

1. Schedule 40, Seamless, Black Steel Pipe, 2 1/2" and under ASTM A-120 with Malleable-Iron Threaded fittings ANSI-B16.3, Class 150. Pipe and fittings shall be coated and wrapped per IAPMO IS 13-91 or provide factory applied plastic coated pipe.

2. Schedule 40, Seamless Steel Pipe 3" and larger ASTM A-53 with Buttweld Steel fittings ASTM-A-234

3. Polyethylene (PE) Natural and Liquefied Petroleum Gas Yard Piping ASTM D2513 with Fusion Joints. Provide Steel Transition Risers and Detectable Warning Tape.

B. Above Ground

1. Schedule 40, Seamless Black Steel Pipe ASTM A 120 2 1/2" and smaller with Malleable Iron Threaded fittings ANSI B16.3 Class 150

a. Press fittings option (1/2-inch thru 2-inch)

1. Viega, MegaPress G Fittings: ½-inch through 2-inch shall conform to ANSI LC4-2012 /CSA 6.32-2012 2nd Edition. MegaPress G fittings with zinc/nickel coating for use with IPS schedule 10 thru schedule 40 carbon steel, or galvanized pipe conforming to ASTM A53. MegaPress G fittings shall have an HNBR sealing element, 420 stainless steel grip ring, 304 stainless steel separator ring, and Smart Connect (SC) Feature.

2. Schedule 40, Seamless Steel Pipe 3" and larger. ASTM A53 with Buttweld Steel fittings ASTM A 234

2.5 FLUE VENT PIPE AND FITTINGS

A. Flues or vents shall terminate above the roof with flashing and a listed vent cap installed in accordance with its listing and the manufacturer's instructions. Flues or vents shall terminate as required per current CMC.

B. Vent cap shall be of the same manufacturer as the flue pipe.

C. For condensing equipment: DuraVentPolyPro venting system: Inner pipe a minimum of 2.2 thick polypropylene pipe. Exterior pipe made of galvalume. ULC-S636 gas gent—BH. Class II venting system, installed per manufacturer's recommendations.

2.6 VALVES

A. Acceptable Manufacturers: Victaulic Milwaukee, Hammond, Jomar, NIBCO, others as noted.

Type	Size Range	Part Number
Ball	2" and smaller (2 or 3 piece)	Milwaukee UPBA400 Hammond UP8301A NIBCO 585-80-LF Victaulic Series P569
Ball	2½" and larger (3 piece)	Milwaukee UPBA300 Hammond UP8604 NIBCO 595Y-LF

Note: Stem extensions of non-thermal-conductive material and protective sleeve that meets UL 2043 approved for inside air plenum and allows operation of value without breaking the

vapor sleeve shall be used on insulated pipe. NIBCO NIB-Seal handle or acceptable equal.

Gate	2” and larger	Milwaukee UP115 Hammond UP645 NIBCO T-113-LF
Gate	2½” or larger	NIBCO F-619-RW
Gate-Underground	3” and larger	Mueller A-2362 NIBCO F-619-RW
Check-Swing	2” and smaller	Milwaukee UP509 Hammond IB940 NIBCO 413Y
Check-Spring	2” and smaller	Milwaukee UP548T NIBCO 480Y-LF
Check-Swing	2½” and larger	Apollo 61YLF NIBCO F-918-B-LF
Check-Spring	2½” and larger	NIBCO F-938-33
Gas Cock	2” and smaller	Milwaukee BA475B Hammond 8901 NIBCO FP600
Gas Cock	2½” and larger	Homestead 611/612 Walworth 1796/1797 (with wrench) NIBCO T-580/585-70-UL

B. All valves in copper piping shall be soldered in or have screwed threads. Copper-tube dimensioned grooved joints are acceptable for 2-1/2” and larger sizes. Threaded valves shall be installed with sweat to screwed adapters.

C. Valves used on potable water services shall be UL classified in accordance with NSF-61, and meets the low-lead requirements of NSF-372.

D. All below grade ball valves shall have stainless steel handles.

E. For CPVC water distribution system-Ball style shut-off valve, solvent welded socket ends, 2” and smaller CPVC body and socket ends, full port (bore) design, EPDM seals (or other “compatible” seal material), low-torque type valve, NSF listed, Plasto-matic CPVC series, Ashai/American CPVC-TB series, Nibco CPVC series. (Note: Contractor may as an option utilize traditional metallic valves for CPVC piping systems, however (1) additional hanger shall be furnished and installed adjacent to either side of the metallic valve).

2.7 HANGERS AND SUPPORTS

A. In general, all pipe hangers and supports shall conform to the following except where special pipe hangers and supports are detailed on the Drawings. In all cases hanger and support details on the Drawings shall take precedent over the following:

Piping 6” Size and smaller:

Items	TOLCO Figure	Anvil
Pipe Hanger	1; 2; 200	260
Side Beam Clamp for Wood Joist	58	207
Beam Coupling for Steel Beams	65	92
Rod Coupling for Connection to “Hilti”	70	135
Inserts in Concrete Decks	107;109A;109AF	N/A
Trapeze Hangers	Tolstruct A12	AS200
Pipe Clamp	TOLCO Cush Clamp	AS004OD-AS098OD

B. Similar items by HOLDRITE, Anvil International, Erico-Caddy or TOLCO/B-Line will be acceptable.

C. Hanger Rods shall conform to the following table:

Tube/Pipe Size	Rod Diameter
½” to 4”	⅜”
5” to 8”	½”
10” to 12”	⅝”

D. Trapeze hangers may be used where parallel runs of pipe occur. All rods on trapeze hangers shall be 1/2" minimum size.

E. Hanger Support Spacing shall be as follows unless shown otherwise on the Drawings:

1. Horizontal:

    a. Cast Iron: Every other joint unless over 4 feet, then at every joint.

    b. Copper: Every 6 feet for 1-1/2 inch and smaller, and 10 feet for 2 inch and larger.

    c. Steel, Gas: Every 6 feet for 1/2 inch, 8 feet for 3/4 inch and 1 inch, and 10 feet for 1-1/4 inch and larger.

    d. Schedule 40 PVC or ABS DWV: Every 4 feet for all sizes. Provide for expansions every 30 feet.

    e. CPVC: Every 3 feet for 1” and smaller, and 4 feet for 1-1/4” and larger.

2. Vertical:

    a. Cast Iron: Base and every floor not to exceed 15 feet.

    b. Copper: Every floor not to exceed 10 feet.

    c. Steel, Gas: Same as horizontal spacing except 1-1/4" and larger at every floor.

    d. Schedule 40 PVC or ABS DWV: Base and every floor with mid-floor guides. Provide for expansion every 30 feet.

    e. CPVC: Base and every floor with mid-floor guides. Contractor shall follow the manufacturer’s recommendations in their installation practices, including support types and spacing and compensation for thermal expansion and contraction of the pipe.

F. Refer to the plumbing code for materials not listed above.

G. CPVC Cautionary Note: Any metallic hanger is approved for CPVC pipe system, however review for sharp edges that might abrade the pipe, discard if sharp edges. Avoid over clamping CPVC pipe risers, review riser clamps with CPVC manufacturers installation instructions.

H. At all points where insulated pipe contacts a hanger or support, the point of contact shall be protected by a metal insulation pipe shield #B3153 as manufactured by B-Line. Equivalent pipe protectors will be considered provided the substitute item meets the same standard of quality and performance as the specified item.

I. Abrasion-Protection Isolators: Use for prevention of damage to tubes and piping caused by abrasion when passing through or in contact with studs, joists, and similar framing.

1. Products:

    a. HOLDRITE #200 Series Isolators and Clamps.

J. Dissimilar Metal Isolators: Use for prevention of damage to tubes and pipes caused by contact between dissimilar metals.

1. Products:

a. HOLDRITE #200 Series Isolators and Clamps.

K. Acoustical Noise & Vibration Isolation System: Consisting of through-stud isolators, pipe clamps, riser clamp pads, neoprene and felt lining material and associated support brackets. For applications requiring acoustical isolation of tubing, piping, and equipment from structure.

1. Products:

a. HOLDRITE Silencer System with HOLDRITE STOUT Bracket System.

L. Seismic Restraint Devices

1. Available Manufacturers:

a. Anvil/Badgr

b. Mason Industries

c. B-Line Tolco Division of Eaton

2. Seismic hanger system design shall meet the requirements of IBC, CBC and ASCE 7-05 and 7-10.

2.8 WALL AND FLOOR PENETRATIONS

A. Fire walls and floors:

1. Wall and floor penetrations shall be protected with a U.L. approved fire rated system. The system shall be per the Drawing Details, or other manufacturer's installation instructions.

2. Fire stopping materials by Hilti, Metacaulk, or 3M are considered equal. The material shall be the same as called out for in the U.L. approved system.

B. Poured concrete walls and floors.

1. Pipes penetrating poured concrete walls and floors shall be protected by providing the following:

a. A Schedule 40 PVC sleeve one (1) size larger than the pipe or one quarter (1/4) inch of foam material wrapped around and secured to the pipe or packed and caulked with mineral wool.

b. Protection shall end flush with the wall or floor surface.

C. All walls and floors:

1. Piping passing through walls and floors exposed to view shall be provided with chrome plated split-ring escutcheon plates in finished areas. Brass or galvanized escutcheon plates may be used elsewhere.

2.9 FLASHING

A. All flashing shall be 4 lb. sheet lead and all vents penetrating the roof shall be flashed and counter-flashed. Stoneman Co. roof flashing assembly with 10" skirt or equal may be used.

B. The flashing for vents penetrating a metal roof shall have a corrosion resistant aluminum base compatible with the roofing system. A rubber type flashing by "Tech Specialties" shall be installed between the flashing and pipe.

C. Individual roof storm drain overflows shall be flashed with Stoneman lead overflow Series #700 assemblies or flashed per vent above.

D. For single ply roofing, provide flashing per roofing manufacturer recommendations or installation instructions.

2.10 VALVE BOXES

A. Brooks Products Inc., Christy Co., or equal with the word "Water" or "Gas" cast in cover as applicable.

2.11 CLEANOUTS

A. Provide cleanouts per Drawings and details on Drawings. Cleanouts as manufactured by J.R. Smith, Mifab, Sioux Chief, or Zurn are acceptable substitutes provided they are equal if approved by Engineer.

B. Cleanout tops to be installed with tamper-proof screws.

2.12 FLOOR DRAINS, FLOOR SINKS AND ROOF DRAINS

A. Provide floor drains as specified on the Plumbing Fixture Schedule. Cast iron body floor drains as manufactured by J.R. Smith, Mifab, Sioux Chief, or Zurn are acceptable substitutes provided they are equal if approved by Engineer.

B. Provide floor sinks as specified on the Plumbing Fixture Schedule. Enameled cast iron floor sinks as manufactured by J.R. Smith, Mifab, Sioux Chief, Zurn, or Commercial Enameling are acceptable substitutes provided they are equal if approved by Engineer.

C. Provide roof drains as specified on the Plumbing Fixture Schedule. Cast iron body roof drains as manufactured by J.R. Smith, Mifab, Sioux Chief, or Zurn are acceptable substitutes provided they are equal if approved by Engineer.

2.13 WATER HAMMER ARRESTORS

A. Provide Wilkins Piston Model #1250XL, Sioux Chief #65X-X, Precision Plumbing Products, or equal, as sized on the Drawings or required by PDI. Install per manufacturer’s instructions.

2.14 AUTOMATIC TRAP PRIMERS

A. Provide Precision Plumbing Products, J.R. Smith, Mifab, Sioux Chief, or Zurn as specified on the Drawings. Install per manufacturer's instructions.

2.15 PLUMBING FIXTURES

A. Fixture locations, quantities, types, sizes and connections shall be as shown on both the Plumbing and Architectural Drawings. If a conflict in fixture location is noted between the Plumbing and Architectural Drawings, the Architectural Drawings shall take precedence.

B. Fixtures shall be thoroughly protected against damage to the chrome plate or enamel, by chipping, scratching or other damage during the entire period of construction. Roof drains, floor sinks and drains, toilet and sink drains, plumbing vents, and all other similar fixtures shall be covered to prevent trash from entering the pipes until final installation of grates, domes, fixtures or other protective devices.

C. Provide fixtures as specified in the Plumbing Fixture Schedule.

D. Stainless Steel lavatories or sinks: Just, Elkay, Advance Tabco, Haws, or Acorn are acceptable substitutes provided they are equal if approved by Engineer.

E. Vitreous China fixtures: American Standard, Kohler, Mansfield, Sloan, Toto, or Zurn are acceptable substitutes provided they are equal if approved by Engineer.

F. Fixture carrier numbers listed are as specified on the Plumbing Schedule; however, carriers as manufactured by J.R. Smith, Mifab, or Zurn are acceptable provided they are equal.

2.16 CONNECTORS

A. Provide Brass Craft "Speedway" or equal heavy pattern iron pipe size brass stops, rigid or flexible supplies and chrome plated brass "P" traps. Stops in "Public" areas to have screwdriver slots and those in "Private" areas to have all cross handles.

B. Provide Brass Craft or equal flexible stainless steel braided water supplies to appliances. They may also be used to fixtures as an option to rigid supplies. Aquaflo is an acceptable substitute.

C. Provide Brass Craft flexible or equal, stainless steel gas appliance connectors. Dormont is an acceptable substitute.

2.17 ACCESS BOXES

A. See section 23 00 13 for access panels.

2.18 PRESSURE GAGES AND THERMOMETERS

A. Provide Marsh Quality gages or equal with 3-1/2" dial, gage cock, in type required. For pump suction, provide compound type.

B. Provide Trerice 7" BX or 3" Bimetal Dial series thermometers or equal, straight, angle, or oblique as required, equipped with separable sockets and well. Provide extension necks as required on insulated line.

C. Arrange gages and thermometers for easy reading.

2.19 BACKFLOW PREVENTORS

A. Provide all potable water outlets with hose attachments with non-removable hose bibb backflow preventers per the C.P.C.

2.20 WATER HEATERS

A. Provide water heaters as specified in Plumbing Schedule or approved equal of size, capacity, recovery, and KW/BTUH input. American, A.O. Smith, and State are considered equal. Heater shall be A.G.A. or U.L. listed.

1. Heater storage tank shall be provided with magnesium anodes, approved standard pressure/temperature relief valve and all standard factory trim.

2. Gas heaters shall be provided with an A.G.A. approved 100% safety shut-off.

3. Provide approved flexible copper supplies for the water heater water connections.

4. Instantaneous tankless water heaters shall be with water flow activated switch to energize the electrical/gas power source, a safety high water temperature limit, and all standard factory trim.

2.21 PRESSURE-TEMPERATURE RELIEF VALVE

A. Pressure-temperature relief valve shall be Wilkins TP220, TP3000 series, or equal.

B. Piping from valve to termination shall be Type L Copper, hard drawn with wrought copper pressure fittings and 95-5 tin antimony filler metal.

2.22 EXPANSION TANK

A. Expansion tank shall be Wilkins XT series as specified on the Drawings or approved equal in size and capacity. Amtrol expansion tanks are considered equal.

2.23 WATER HEATER SEISMIC RESTRAINTS

A. Seismic restraints shall be Watts Spacemaker restraint system Model E-50 or E-100 as applicable for the water heater specified. Spacemaker Model #TSE-25 or Seismik Model #SR-2 may be substituted when first approved by the Engineer.

2.24 PROTECTIVE INSULATION (ADA FIXTURES)

A. Provide approved manufactured, molded antimicrobial vinyl protective pipe and fitting covering for exposed waste and drain assembly and for hot and cold water supplies and stops. Protective system shall consist of pre-formed pipe or tubing sleeve and pre-formed fitting patterns for trap and stops. Assembly shall have integral snap fasteners.

B. Provide protective covering for off-set drain assembly and disposer at kitchen sinks.

C. Foam pipe wrap, duct tape, baggy-type covers, tie-strap fasteners are not acceptable.

D. Acceptable manufacturers:

1. Oatey/Dearborn Brass “ADA”
2. Truebro “Lav-Guard”
3. Plumberex “Pro-Xtreme”
4. Zurn #Z89XX-XX

2.25 INSULATION

A. All pipe insulation shall conform to Section 123 of the California Energy Efficiency Standards except to the extent that this Specification supersedes the minimum standards as established by the Code, in which case this Specification shall take precedent. Outside insulation shall be protected with a hard plastic or metal shell covering.

B. Insulation and lining material shall meet requirements of flame spread not to exceed 25 and smoke developed not to exceed 50 as tested by Procedure ASTM-E-84, NFPA 255 or U.L. 723 and shall conform to NFPA 90A and 90B.

C. Condensate piping insulation in return air plenums shall be insulated with Armacell AP/Armaflex tube insulation with reinforced lap seal or approved equal.

D. Domestic cold water piping shall be insulated with a minimum 1" insulation in unheated areas of the building and where exposed outside of the building.

E. Domestic hot water piping shall be insulated with Owens-Corning Fiberglass heavy density pipe insulation 25 ASJ/SSL-II (All Service Jacket/Double/ Self-Sealing Lap). Insulation shall be UL rated non-combustible pipe insulation with a k factor of 0.24-0.28 @ 100 degrees F. mean temperature, an embossed vapor barrier laminated and pressure sealing lap adhesive. All lap and butt strips shall have integral pressure-sensitive strips and shall be applied in strict accordance with manufacturer's instructions.

1. Closed cell polyethylene foam by IMCOA or equal may be used at Contractor's option provided it meets the above requirements.

F. Insulation thickness’ shown below are based on insulation having a conductivity range of 0.22 to 0.28 per BTU/inch per hour per square foot per °F temperature of 100 degrees F.

1. Temperature Range: Above 105°F-140°F

Pipe Size	Minimum Insulation Wall Thickness

1” and less	1.0”
1.25”	1.5”
1.5”	1.5”
2” or more	2.0”

G. Insulation materials not meeting the specified conductivity range shall be submitted for approval and determination of the insulation thickness required.

2.26 CIRCULATION PUMP: (DOMESTIC)

A. Provide pump(s) per schedule. Bell and Gossett, Grundfos, Laing, Xylem, or Taco are considered equal.

PART 3 - EXECUTION

3.1 GENERAL CONDITIONS

A. Examine the areas and conditions under which Work of this Section will be performed. Conditions detrimental to timely and proper completion of the Work shall be brought to the attention of the Architect before the installation of materials. Do not proceed until unsatisfactory conditions are corrected. Incorrectly installed materials requiring changes will be at Contractor's expense.

B. All plumbing fixtures, appliances, and appurtenances furnished with manufacturer's installation instructions shall be installed per those instructions.

3.2 PLUMBING SYSTEM LAYOUT

A. Lay out the plumbing system in careful coordination with the Drawings. Determine proper elevations for all components of the system and use only the minimum number of bends to produce a satisfactorily functioning system.

B. Follow the general layout shown on the Drawings in all cases except where other Work may interfere.

C. Lay out pipes to fall within partitions, walls, or roof cavities, and to not require furring other than as shown on the Drawings.

3.3 PIPING INSTALLATION

A. Pipe sizes as shown on drawings are Nominal Pipe Size (NPS) or Iron Pipe Size (IPS). Drawings and fixture schedule indicate pipe sizing per the CPC and Standard Engineering Practice. Pipe sizes shall be maintained to fixtures, appliances and equipment. Approved reducing fittings shall be installed at all points of connections.

B. Install piping generally square with building, free of traps or air pockets, and true to line and grade. Keep all piping tight to the building structure, unless pipe slope is required. Do not install piping in any locations where, in the Architect's opinion, it will interfere with the use of the building or create a safety hazard. Where space is inadequate, notify the Architect in time to avoid unnecessary Work. Install all exposed piping as high as possible without interfering with other trades.

C. Make changes in direction with manufactured fittings; use long radius elbows. Street elbows, bushings, close nipples and bending of pipe or tubing will not be allowed.

D. Provide "P" traps at sanitary sewer drainage devices without integral traps.

E. All natural gas piping under structures or concrete slabs will be installed in a protective vent sleeve. Sleeves under a building will be vented to outside the building per detail on Plans. Sleeves under concrete slabs will extend a minimum of 1 foot beyond the slab.

All sleeves will be sloped 1/8" per foot up toward the vented end. The vent end of sleeves under slabs will terminate under a landscaped or asphalted area.

F. Gas piping shall be tapped off the top or side of pipe and ends of mains shall be provided with dirt legs.

G. Gas press fittings

1. Viega, Mega Press G Systems: Sealing elements shall be verified for the intended use. Pipe ends shall be cut on a right angle (square) to the pipe. Pipe ends shall be reamed chamfered and all paint, lacquer, grease, oil or dirt shall be removed from the pipe end with an abrasive cloth, or with the Ridgid MegaPress pipe end prep tool. Visually examine the fitting sealing element to ensure there is no damage. Utilizing a Viega MegaPress Insertion Depth Inspection Gauge mark the tube wall, with a felt tip pen, at the appropriate location, or insert the pipe fully into the fitting and mark the pipe wall at the face of the fitting. Always examine the pipe to ensure it is fully inserted into the fitting prior to pressing the joint. MegaPress G fittings shall be installed using Ridgid, MegaPress Tools. MegaPress G fittings shall be installed according to the most current edition of the Viega installation guidelines. Installers shall attend a Viega MegaPress installation training class.

H. Underground plastic pipe will horizontally transition to metal pipe 5 feet before the above ground riser. Install plastic pipe with a minimum of 36" of cover when located under areas of possible vehicle traffic. Approved metallic pipe must be used if the minimum depth is not met. A tracer wire, terminating at each end at an exposed location, will be installed with all underground plastic pipe. Gas piping will also have a continuous tape marked "Gas" laid 6" above it.

1. Piping may terminate a maximum of one foot above ground when encased in a listed metallic transition riser.

I. Use friction wrenches when installing brass, polished, or soft metal piping, and when installing piping exposed in finished areas. Replace piping showing wrench marks.

J. Attach escutcheon plates to pipes with set screws or spring clamps with concealed hinges. Continue insulation through escutcheon plates.

K. General:

1. Proceed as rapidly as the building construction will permit.
2. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.
3. Cut pipe accurately, and work into place without springing or forcing, properly clearing windows, doors, and other openings. Excessive cutting or other weakening of the building will not be permitted.
4. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.
5. Provide sufficient swing joints, ball joints, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Drawings.
6. Support piping independently at pumps, coils, tanks, and similar locations, so that weight of pipe will not be supported by the equipment. Support the equipment independently from the pipe.

7. Pipe the drains from mechanical equipment, drip pans, relief valves, air vents and similar locations, to an open sight drain, floor drain, or other acceptable discharge point, and terminate with an air break or air gap per C.P.C.
8. Securely bolt all equipment, isolators, hangers, and similar items in place.

3.4 IDENTIFICATION OF PIPING SYSTEMS

A. Use pipe material compatible pipe labels and markers.

3.5 HANGER AND PIPE SUPPORT INSTALLATION

A. Support pipes from structure with assemblies specified. Provide auxiliary members, anchors, guides, and sway braces necessary to maintain pipe alignment and prevent excessive movement or strain on piping system or components; allow for expansion and contraction of piping. Provide at least one hanger for each branch. Do not use powder driven fasteners, wire, perforated tape, nails, wood blocking, or other makeshift devices to support pipe.

B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

C. Isolate piping systems from building structure to minimize noise transfer by using acoustical suspension isolator silencer and bracket system.

D. Protect tubing and piping from damage caused by abrasion when passing through studs, joists, and similar framing using abrasion protection isolators.

E. Penetration Protection: Provide allowance for thermal expansion and contraction of copper tubing passing through a wall, floor, ceiling or partition by wrapping with an approved tape or pipe insulation, or by installing through an appropriately sized sleeve. Penetrations of fire resistance rated assemblies shall maintain the rating of the assembly.

F. In plenum-rated applications, use tested clamp and isolator support systems designed specifically for this application.

G. Prevent damage to piping and tubing caused by contact between dissimilar metals using insert system designed specifically for this application.

H. Attach supports to structure with bolts, screws or concrete anchors, per support manufacturer’s requirements.

I. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

J. CPVC Piping Systems: Provide necessary allowance in piping systems to handle expansion and contraction. Install ample swings or offsets in branch connections to avoid undue strains on fittings or short pipe supplies. Provide expansion loops and pipe anchors as required and/or indicated on the drawings. Refer to manufacturers’ recommendations for proper loop sizing of CPVC piping systems.

3.6 JOINTS AND CONNECTIONS

A. Cut pipe shall be reamed to full inside diameter of pipe. Cut threads straight and true. Insure all filings have been removed from inside of the pipe. Apply liquid Teflon to male pipe threads and not inside fittings. Use graphite on cleanout plug threads.

B. Couplings in cast iron "No-Hub" soil/waste pipe and fittings shall be made up with neoprene gaskets and stainless steel bands conforming to CISPI 310, torque to the manufacturer's specification with an approved torque wrench. Joints in hub and spigot shall be made up with compression gaskets conforming to ASTM C-564.

C. Joints in copper tube shall be made with 95-5 tin-antimony or lead-free solder, applied in strict accordance with the manufacturer's directions.

D. Grooved joints shall be installed in accordance with the manufacturer's latest published instructions. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service. Gaskets shall be molded and produced by the grooved coupling manufacturer. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Grooved coupling manufacturer's factory trained field representative shall provide on-site training for contractor's field personnel in the proper use of grooving tools, application of groove, and installation of grooved piping products. Factory trained representative shall periodically visit the jobsite to ensure best practices in grooved product installation are being followed. Contractor shall remove and replace any improperly installed products.

E. Dissimilar metals shall be isolated with dielectric couplings, "EPCO" or approved equal. Dielectric Waterway Fittings shall be UL classified in accordance with ANSI / NSF-61 for potable water service, Victaulic Style 647. Provide access panels at all hidden couplings.

F. All plastic pipe shall be joined in accordance with the manufacturer's recommendations for their pipe and IAPMO Installation Standard per the latest edition of the C.P.C.

G. Press Connections: Copper press fittings shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer.

H. Pipe Protection: Provide protection against abrasion where copper tubing is in contact with other building members by wrapping with an approved tape, pipe insulation or otherwise suitable method of isolation.

I. Penetration Protection: Provide allowance for thermal expansion and contraction of copper tubing passing through a wall, floor, ceiling or partition by wrapping with an approved tape or pipe insulation, or by installing through an appropriately sized sleeve. Penetrations of fire resistance rated assemblies shall maintain the rating of the assembly.

J. FlowGuard Gold® CTS CPVC pipe/fittings shall be joined by employing One-Step solvent cements that meet or exceed the requirements of ASTM F493. The standard practice for safe handling of solvent cements shall be in accordance with ASTM F402. Solvent cement shall be listed by NSF International for use with potable water and shall be 'Yellow' in color and shall be approved for use by the pipe/fitting manufacturer.

K. Corzan® HP / Corzan® schedule 80 IPS CPVC pipe/fittings shall be joined by employing a Two-Step solvent cementing process. Solvent cements that meet or exceed the requirements of ASTM F493 and primers that meet or exceed the requirements of ASTM F656. The standard practice for safe handling of solvent cements shall be in accordance with ASTM F402. Solvent cement and primer shall be listed by NSF International for use with potable water, and shall be approved for use by the pipe/fittings manufacturer. Also, the solvent cement shall be 'orange' in color and the primer shall be 'purple' in color.

    1. Flanges for Corzan® HP / Corzan® piping shall be installed on pipe ends with approved CPVC Two-Step solvent cementing process (as indicated above) and then bolted together per the manufacturer's instructions and torque ratings.

    2. Threading may be preformed on Corzan® CPVC schedule 80 IPS pipe 4" and smaller, per the manufacturer's instructions. Threads shall be in accordance with ANSI B1.20.1 Taper Pipe Thread.

3.7 SANITARY SEWER, VENT AND INDIRECT WASTE SYSTEM INSTALLATION

A. Install horizontal drainage piping at a minimum 2%, condensate 1%, slope unless otherwise noted. Where this is impractical notify the Architect before installing the pipes.

B. Install vent piping to drain back into the sewer system.

C. Provide cleanouts where shown on Drawings and where required by governmental agencies having jurisdiction.

1. All cleanouts to grade shall be firmly secured by means of a concrete block 20" square by 5" thick, and shall be flush with finished grade, unless otherwise noted on the plans.

D. Provide automatic trap primers as specified at floor sinks and drains as indicated on Drawings or where required by governmental agencies having jurisdiction. Provide access panels for all hidden mechanical trap primers.

3.8 FLUE VENT PIPE INSTALLATION

A. All flues or vents shall terminate above the roof with flashing and a listed vent cap installed in accordance with its listing and the manufacturer's instructions. Vent cap shall be of the same manufacturer as the flue pipe. Flues or vents shall terminate per the latest Edition of the C.P.C.

3.9 VALVE INSTALLATION

A. Provide valves in the water, air, and gas systems. Locate and arrange so as to give a complete regulation of apparatus, equipment, and fixtures.

B. Provide valves in at least the following locations:

1. In branches and/or headers of water piping serving a group of fixtures.
2. On both sides of apparatus and equipment.
3. For shutoff of risers and branch mains.
4. For flushing and sterilizing the system.
5. Where shown on the Drawings.

C. Locate valves for easy accessibility and maintenance. Provide access panels for all hidden valves.

D. Unions shall be installed downstream of all screwed valves.

E. All gas pressure regulating valves shall be vented to the atmosphere.

3.10 WATER HAMMER ARRESTOR INSTALLATION

A. Provide water hammer arrestor on hot and cold water lines.

1. Install at all quick closing valves, solenoids, and supply headers at plumbing fixture groups.
2. Locate and size as shown on Drawings, and where not shown, locate in accordance with Plumbing and Drainage Institute Standard WH-201.
3. Install water hammer arrestor behind access panels.

3.11 BACKFLOW PREVENTION INSTALLATION

A. Protect plumbing fixtures, faucets, hose connections, and other equipment having plumbing connection, against possible back-siphonage.

B. Arrange for testing of backflow devices as required by the governmental agencies having jurisdiction.

3.12 PLUMBING FIXTURE INSTALLATION

A. Connect plumbing services to fixtures as shown on Drawings and as specified.

B. Install compression stops and flexible supplies per fixture manufacturer's recommendation or as high as possible on wall directly below fixtures.

C. Install fixtures at right angles to, and tightly against, building surfaces, and in proper alignment. Fill gaps between fixtures and building surfaces with white grout. Mounting heights and locations shall be as shown on the Drawings, or, if not shown, as directed by the Architect.

3.13 INSULATION INSTALLATION

A. Clean and dry surfaces prior to application of insulation or adhesives.

B. Insulate piping, fittings, valves, and strainers. Leave unions exposed. Where insulation terminates, bevel ends of insulation and continue jacket over insulation and secure to pipe. Do not interrupt insulation at hangers, supports, clamps, or penetrations through structure. Fittings shall be finished with "Zeston" or approved equal fitting closures. If fitting closures not available, use 8 oz. canvas dipped in "Seal-Fas".

C. Attach longitudinal jacket laps and butt strips with factory applied pressure sensitive adhesive. On concealed piping only, outward clinching coated staples at two inch spacing may be used. Cover elbows with one piece polyvinyl chloride covers. Secure with tack fasteners. Tape ends of covers with matching tape on exposed piping. Seal off all cut ends with canvas and Benjamin Foster 30-36.

D. Install closed cell polyethylene foam per manufacturer's instructions.

E. Insulate traps and trap arms on floor sinks located above slab receiving discharge from ice machines and soda dispensers with ½" insulation.

F. Insulate primary condensate piping located within return air plenums with ½" wall thickness.

G. CPVC Piping Systems: Confirm compatibility with all insulation products that will encounter CPVC.

3.14 TESTING AND ADJUSTING

A. Provide personnel and equipment, and arrange for and pay the costs of, all required tests and inspections required by governmental agencies having jurisdiction. See Section 23 0013 for test requirements.

B. Where tests show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.

C. CPVC Piping Systems: Test per manufacturer's installation instructions.

1. DO NOT TEST WITH AIR OR COMPRESSED GAS.

D. Gas press fittings: Test per manufacturer's installation instructions.

1. After MegaPress G fittings have been installed a "two step test" shall be followed. Utilizing air, or dry nitrogen, pressurize the system between .5 psi and 45 psi. Check the pressure gauge for pressure loss. If the system does not hold pressure, walk the system and check for un-pressed fittings. Should you identify an un-pressed fitting/s ensure the pipe is fully inserted into the fitting and properly

marked prior to pressing the joint. After appropriate repairs have been made, test the system per local code, or specification requirements, not to exceed 200 psig.

E. Adjust the system to optimum standards of operation.

3.15 CLEANING (For potable water systems.)

A. Disinfection: The copper hot and cold water distribution system shall be disinfected prior to being placed in service. The system shall be disinfected in accordance with AWWA C651 or the following requirements:

1. The piping system shall be flushed with potable water until discolored water does not appear at any of the outlets.
2. The system shall be filled with a water chlorine solution containing at least 50 parts per million of chlorine. The system shall be valved off and allowed to stand for 24 hours. Or, the system shall be filled with a water chlorine solution containing at least 200 parts per million of chlorine. The system shall be valved off and allowed to stand for 3 hours.
3. Following the standing time, the system shall be flushed with water until the chlorine is purged from the system.
4. Provide bacteriological sampling and analysis results to the Engineer for review.

3.16 WARRANTY

A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or owner.

END OF SECTION 22 00 00

SECTION 23 00 00

HEATING, VENTILATION, AND AIR CONDITIONING

PART 1 - GENERAL

1.1 DESCRIPTION:

A. Related Documents:

1. The other Contract Documents complement the requirements of this Section and apply to this Section.
2. Division 1 - General Requirements, General Mechanical Section 23 00 13, and General Commissioning Section 01 91 13 apply to the Work of this Section.
3. Where requirements of the Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

B. Codes and Regulations:

1. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.
2. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Architect.

C. Included: Work includes, but is not necessarily limited to, the following.

1. The Work covered by this Specification shall include furnishing labor, material, equipment and services to construct, install and place in operation, the complete Heating, Ventilating and Air Conditioning Systems to the extent as indicated, and as shown on the Drawings and specified herein. The Work covered under this Section shall hereinafter be referred to as the Mechanical System.
2. A system of temperature controls shall be furnished and installed complete as hereinafter described. Low voltage wiring and conduit, complete with electrical accessories and materials as required for the installation of the temperature control system shall be furnished and installed under this Section of the Contract, but shall conform to the Specification requirements as set forth under Division 26.
3. Roof Top Gas Heat/Mechanical Cooling A/C Units
4. VRF Heat Pump Condensing Units (w/ Heat Recovery)
5. Fan Coil Units, VRF / Common Split Systems
6. Heat Pump Condensing Units
7. Energy Recovery Ventilators
8. Evaporative Coolers for Kitchen Make-Up Air
9. Commercial Kitchen Ventilation for Type 2 Hood
10. Centrifugal Exhaust Fans and Roof Exhausters
11. Supply, return, and exhaust duct systems complete with grilles, registers and diffusers.
12. Filter and Filter Boxes

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13. Duct, Pipe and Equipment Insulation

14. Space Temperature Controls

15. Refrigerant Piping

16. Fire Dampers

17. Vibration Isolators

D. Work Not Included In This Section:

1. Blocking, framing and wood supports required for the purpose of accommodating the Mechanical System unless specifically called for under this Division. The contractor is responsible for the correct location of such items and shall bear the expenses covering their omission or improper location.

2. Electrical connections to motors, electric starters, disconnect and over-current protective devices, unless specifically called for by this Section, or unless the equipment is furnished as an integral part of the Mechanical System Equipment, as hereinafter specified or noted on the Drawings.

3. Line voltage electrical wiring and conduit, except where specifically called for on the Drawings or hereinafter in this Section.

4. Painting, except when supplied as factory finish, or specifically called for in this Section or on Drawings.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

B. Without additional cost to the Owner, provide such other labor and materials as are required to complete the Work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

1.3 SUBMITTALS

A. If the heating and/or air conditioning units are substituted with a different brand than that specified on the Drawings the Title 24 Calculation may have to be re-run. This re-calculation is NOT to be considered a standard CA task and will be billed hourly (6 hr minimum) as an Additional Service, at the current rate defined in Exhibit B for Senior Energy Analyst.

B. Comply with pertinent provisions of Architectural Section.

C. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit the following to the Architect for approval prior to acquisition:

1. Materials list of items proposed to be provided under this Section including, but not limited to heating, ventilating and air conditioning equipment and mountings, air distribution equipment, ductwork and fittings, flexible ductwork, flue vent pipe, duct specialties, flexible connections, insulation, lining and adhesive, duct joint sealer, temperature controls, piping and accessories.

2. Manufacturer's specifications, catalog cuts, and other data needed to prove compliance with the specified requirements. All pieces of equipment shall be clearly identified on corresponding manufacturer's literature being submitted.

3. Shop Drawings or other data as required to indicate method of installing and attaching equipment, except where such details are fully shown on the Drawings.

4. Submittals for entire Project shall be submitted at the same time or may be rejected until all are included in one submittal package.

5. Submittals shall be provided electronically in PDF format, bookmarked by design tags for equipment and specification sections for materials. Alternativley, hard copies will be accepted if 6 copies are provided, bookmarked as previously noted and bound together separately in thee-hole folders or three ring binders.

1.4 DESIGN CHANGES CAUSED BY PRODUCT SUBSTITUTIONS

A. Contractor shall pay costs of design and installation for changes resulting from substitution of alternate products.

B. Acceptance of alternate products by Architect does not change this requirement.

1.5 PRODUCT HANDLING

A. Comply with pertinent provisions of Architectural Sections.

PART 2 - PRODUCTS

2.1 HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

A. Heating, Ventilating, and Air Conditioning Equipment: Equipment shall be as specified on the Drawings. All other equipment shall be pre-approved by the Mechanical Engineer.

B. It shall be the responsibility of the Contractor to see that any substituted equipment performs similarly to that which is specified and fits in the same area as specified. Cost of any additional Work caused by the substitution of equipment shall be borne by the Contractor.

2.2 AIR DISTRIBUTION EQUIPMENT

A. Grilles, registers and ceiling diffusers and other accessory equipment shown on the Drawings and "Grille, Register and Diffuser Schedule" shall be manufactured by Titus unless shown otherwise.

B. Any substitutions of the above equipment which may be proposed by the Contractor shall be re-sized to suit his equipment by the proposed manufacturer and submitted in tabular form listing components proposed for each location in the System, identifying each as to location, design, air quantity passing through the devices, pressure drop, noise criteria data, velocities of air leaving the device and "K" flow factors for each item. Manufacturer's data sheets showing dimensions and recommended method of installation for each component must also be included.

2.3 CONTROL DAMPERS

A. Provide Greenheck model VCD-23, class 1 @ 4”wg as scheduled on plans. Damper frame shall be galvanized steel, formed into a 5” X 1” structural hat channel. Blades shall be 16 gauge galvanized steel strengthened by three longitudinal 1” deep Vee grooves running the entire lenth of each blade. Blade seals shall be TPE. Jamb to be flexible stainless steel compression type. The linkage shall be concealed in the frame out of the air stream,

stainless steel material. The Axle shall be stainless steel. Bearings to be stainless steel. Finish shall be Hi-Pro polyester power coated.

2.4 LOUVERS

A. 4" deep louvers, Greenheck, Model ESJ-401, or approved equal. Deflection blades shall be spaced on 4" centers having 1/2" high vertical baffle and an additional lateral center rain hood. The edges of louver blades shall be folded or beaded to exclude driving rain. Louvers blades shall be oriented to minimize the entrainment of rainwater. Louver blades, heads, sills, jambs, braces and mullions shall be made of aluminum. Louvers shall be provided with flanges.

B. Provide 1/2" aluminum bird screen.

2.5 RECTANGULAR SHEET METAL DUCTWORK

A. Rectangular supply, return, outside air and exhaust ducts, single leaf dampers and plenums shall be fabricated from prime grade galvanized steel sheets of lock form quality and shall be constructed in accordance with appropriate tables of the latest ASHRAE "Guide and Data Book" and SMACNA "HVAC Duct Construction Standards" handbook and Chapter 6 of the 2019 CMC.

B. Transverse Duct Joints shall be made with The Ductmate System. When using The Ductmate System, construction of the duct such as gage, reinforcing, etc. shall be as indicated in the latest addition of the applicable SMACNA standards. With proper data, an equal may be submitted, providing the corners have a downset and corner clips to insure airtight integrity. Testing must be done by a nationally recognized testing laboratory. The standard Ductmate 35 System joint is the equivalent of a SMACNA "J" connection. The Ductmate 25 System joint is the equivalent of a SMACNA "F" connection. The installation of the Ductmate System shall be in accordance with the latest manufacturer's printed Assembly and Installation Instructions.

C. Each duct or plenum shall be diagonally cross-broken for rigidity.

D. Duct bends, fittings, transitions, etc. shall be fabricated in accordance with Fabrication Standards as shown on the Drawings or in accordance with latest SMACNA "HVAC Duct Construction Standards" where not shown on Drawings.

E. Support ducts to joists or similar structural members. Except where indicated otherwise, ducts with a side of 24" or more shall be supported on Ductmate trapeze duct hangers consisting of 2" high x 1-1/2" wide x 18" gauge channel and 3/8" diameter hanger rods hung from support brackets bolted to structural members. See also Special Fabrications as shown on the Drawings. Duct supports shall be eight (8) feet maximum on center.

F. At branch ducts, provide manually operated dampers of the type and arrangement shown on the Drawings, two gages heavier than the duct (if single leaf type) in which installed, and equipped with locking quadrants and closed end bearings.

G. Sizes shown on Drawings are net inside dimensions. Enlarge duct to accommodate lining.

2.6 ROUND DUCTWORK AND FITTINGS

A. 2-10" w.g. round duct through 61" in diameter shall be United Sheet Metal spiral lockseam unseal duct, or approved equal, manufactured from galvanized steel meeting the ASTM A-527-71 in the following gages:

Diameter	Metal Thickness
3-13"	26 ga.

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14-23”	24 ga.
24-37”	22 ga.

B. Round duct shall be new and exclusively obtained for this project. Each piece shall be in 20’ lengths. Ducts shall be cut to length required with joints only at fitting locations, except on duct runs longer than 20 feet.

C. Spiral duct and fitting connections, 15" diameter and larger shall be Ductmate Spiralmate round duct connectors. The connector system shall consist of two mating round duct connector flanges roll-formed from hot dipped galvanized steel with an integral sealant and closure ring roll-formed from hot dipped galvanized steel.

D. Fittings shall be United Sheet Metal galvanized fittings in the following gauges:

Diameter	Metal Thickness
3-13”	24 ga.
14-23”	22 ga.
24-37”	20 ga.

E. Spiral duct fittings must be manufactured as separated fittings and shall not be saddle taps, stubs or tap-in fittings tapped into spiral duct, nor may they be dove-tailed tap-ins into pipe or fittings.

F. Reducers shall occur after a branch tap occurs on the main portion of the fitting. Divided-flow fittings shall be used unless shown otherwise on the Drawings.

G. Joints on ducts and fittings shall be covered and sealed with 4" wide, 6 oz. canvas saturated with Arabol lagging adhesive, or Hardcast DT tape in conjunction with Hardcast FTA-20, non flammable, non-toxic adhesive, or GlenKote duct sealer or other approved mastic type sealer. Duct tape will not be allowed. Where exposed to weather, paint lagging strips with two coats of silver enamel paint.

H. All ductwork shall be constructed in accordance with appropriate tables of the latest ASHRAE “Guide and Data Book” and SMACNA “HVAC Duct Construction Standards” handbook and Chapter 6 of the 2019 CMC. Duct gauges to be in accordance with parts A and D of this section.

I. At branch ducts, provide manually operated dampers of the type and arrangement shown on the Drawings, two gages heavier than the duct (if single leaf type) in which installed and equipped with locking quadrants and closed end bearings.

2.7 FLEXIBLE DUCT

A. Flexible air duct shall be JP Lamborn Co., AMR-25.Flexible duct shall be factory made with a sound absorbing, spun-bonded, non-woven inner core. R-4.2 insulation to encompass core and a metalized polyester reinforced vapor barrier surrounding entire duct. Ends shall be secured to rigid duct per current SMACNA DCS with UL-181 FX tape. Length not to exceed 7 feet. Duct shall be Class 1, UL approved, and meet NFPA 90A, 90B and CMC minimum requirements.

B. Use only the minimum length required to make the connection. In no case shall any section of flexible duct exceed 7 feet in length.

C. Use two layers of UL listed 181 duct tape to connect flexible duct to the metal duct if flexible duct does not have S.M. collars.

D. The number of bends shall not exceed a combined total of 90 degrees. 90 degree bends will not be allowed at diffuser connections.

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2.8 DUCT SPECIALTIES

A. Damper Regulators and Bearings: Duro-Dyne "Specline" SR-Series or approved equal, lever type with matching end bearing. Regulator set shall include rubber gasket between regulator and duct, spring washer between core and housing, wedge pin, dial indicator and handle. Matching end bearing shall be closed end with rubber gasket:

Model	Size
148	10” and Under
388	20” and Under
128	21” and Above

B. Access Panels: Access panels shall be located at all points where adjustable mechanisms are installed internal to or on the surfaces of the ductwork. Where adjustable mechanisms are concealed by walls or ceilings, "Elmdor" or approved equal access doors shall be installed. Size shall be suitable for convenient servicing. Tile Walls: Doors and Frame: Stainless Steel. Other areas: recess type to receive ceiling or wall finish in order to provide "Blind Finish".

C. Fire Dampers: Fire dampers shall be installed where shown on the Drawings and/or required, and shall be of a type approved by the U.L. Laboratories, Inc. and the State of California Fire Marshal. Dampers shall be installed per manufacturer's instructions. Provide access door in duct at each fire damper such that damper is easily accessible.

D. Volume Dampers:

1. In rectangular ducts greater than 1.5 sq. ft., provide Pottorff Model CD42, or equal, factory fabricated opposed blade damper, 16 gauge blades, and brass bearings. Blade width shall not exceed six inches.

2. In rectangular ducts 1.5 sq. ft. and less, provide single leaf dampers as described in Section 15600, 2.3 (a. and g.).

3. In round ducts 15" in diameter and less, provide shop fabricated galvanized sheet metal plate dampers. Plate shall be 18 gauge or shall be two even gauges heavier than duct; minimum thickness 22 gauge. Provide stiffening beads at 1/3 points in dampers lighter than 18 gauge.

4. In round ducts 16" and greater, provide Pottorff opposed blade damper Model CD22R or approved equal.

5. In round ducts 4” – 24” in diameter, above “hard” ceilings, provide DuroZone Cable Operated Damper. Cable length to be between 3 and 15 FT long. Contractor to determine proper length to be use.

E. Provide 20 gauge galvanized sheet metal escutcheon plates at duct penetrations of finished building surfaces. Install tight against surface and securely attached to duct. Continue insulation through openings.

F. Duct Mounted Access Doors:

1. In rectangular duct provide, DuroDyne Model IAD, Ductmate "Sandwich", or equal, insulated, duct mounted access doors with Cam-Lock operated latches where shown on drawings or required for access to duct mounted equipment. Doorframe shall be 24-gauge with double wall door and 1/2" glass fiber insulation. Size doors to provide easy access to equipment.

2. In round ducts, provide Ductmate - METU round duct access doors, fully insulated, with attached gasket and springs between inner and outer door. Access doors shall be as large as practical as duct size will allow.

2.9 FLEXIBLE CONNECTIONS

A. Provide fireproof, insulated, non-porous, flexible connections between fans and ducts or casings and where ducts are of dissimilar metals. For round ducts, securely fasten flexible connections by zinc coated steel clinch-type drawbands. Flexible connections shall be DuroDyne "Insulfab" or "Insulflex" or approved equal.

B. Provide a duct support next to each flex connector to prevent any strain on connection.

2.10 CONDENSATE DRAINS AND DRAIN PANS

A. Air conditioning cooling coils shall have a condensate drain pipe, type "M" copper, to drain the condensate as shown on drawings.

B. Fan coils or DX cooling coils located in an attic or furred space shall have a water level detecting device that will shut off the equipment or appliance in the event the primary drain is blocked.

C. Alternately, Fan coils or DX cooling coils located in an attic or furred space shall have a secondary drain pan constructed of 20 gauge galvanized steel sheet metal. This pan shall have a drain line discharging to a conspicuous location. This pan and drain is in addition to the normal condensate drain line from the coil.

2.11 PIPE HANGERS AND SUPPORTS

A. In general, pipe hangers and supports shall conform to the following except where special pipe hangers and supports are detailed on the Drawings. In cases hanger and support details on the Drawings shall take precedent over the following:

Pipe 6” Size and Smaller

Items	Superstrut Number
Pipe Hanger	710
Side Beam Clamp for Wood Joist	540
Beam Coupling for Steel Beams	U563-U562
Rod Coupling for Connection to “Hilti” Inserts in Concrete Decks	H-119
Trapeze Hangers	A1200-A1202
Pipe Clamp	A716 or 701W/S-716

B. Similar items by Unistrut, Securstrut, Michigan, or B-Line will be acceptable.

C. Hanger Rods shall conform to the following table:

Tube/Pipe Size	Rod Diameter
1/2" to 4”	3/8”

D. Hanger Support Spacing shall be as follows unless shown otherwise on the Drawings:

1. Horizontal:

a. Copper: Every 6 feet for 1-1/2 inch and smaller, and 10 feet for 2 inch and larger.

b. Steel, Gas: Every 6 feet for 1/2 inch, 8 feet for 3/4 inch and 1 inch, and 10 feet for 1-1/4 inch and larger.

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2. Vertical:

a. Copper: Every floor not to exceed 10 feet.

b. Steel, Gas: Same as horizontal spacing except 1-1/4" and larger at every floor.

2.12 DUCT SMOKE DETECTORS:

A. HVAC systems rated at 2000 CFM or greater shall be equipped with a duct smoke detector to automatically shut off the HVAC system if smoke is detected.

B. The detectors shall be installed in the main supply duct downstream of any filters, before any branch ducts or terminal connections.

C. The detector shall be System Sensor Innovairflex D4120 4-wire Photoelectric Smoke Detector. Provide with Factory NEMA 4 enclosure if mounted outside.

2.13 DAMPER ACTUATORS

Provide actuators as specified in the mechanical control drawings. If actuators are not specified in the mechanical control drawings or in the mechanical legend or detail drawings, then the following shall be used:

A. Actuators shall be Belimo. Actuator shall be direct coupled over the shaft, spring return type.

2.14 KITCHEN HOOD, EXHAUST AND MAKE-UP SYSTEMS

A. Type I Hood: Type I grease and smoke hoods shall be constructed of 18 gauge stainless steel.

B. Exhaust Fan: Fans shall be listed and approved by UL for restaurant cooking appliances.

C. Exhaust Duct:

1. Ducts shall be constructed of and supported by carbon steel not less than 0.054 inches (16 gauge) or stainless steel not less than 0.043 inches (18 gauge) in thickness.

2. No-Wrap Alternate: Ducts shall be premanufactured Jeremias DWFL-ZC grease duct as specified and detailed on the plan layouts.

D. Exhaust Duct Wrap:

1. Provide Thermal Ceramics Fire Master Commercial Kitchen Grease Duct Wrap, 1-1/2, thick, 2 layers. UL No.: G18 and C-AJ-7119 and ICC-ES: ESR 2213.

2. Install per all manufacturer's requirements.

E. Fire Suppression Systems:

1. Type I systems shall be equipped with a Ansel R102 or equal fire suppression system.

2. Provide Mechanical gas shut-off valve.

3. Connect system into local building fire alarm system.

4. System shall be approved by local jurisdiction prior to installation.

F. Code Requirements:

1. Systems shall be installed per 2019 CMC, Chapter 5.

2.15 ELECTRICAL EQUIPMENT

A. Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for motor control specified. Mount starter adjacent to equipment. See electrical drawing. Maintain minimum of 3' clearance to front of device.

B. Motor Starters: Shall be NEMA I or III as appropriate, general purpose, weather-resistant, with watertight enclosure where required.

2.16 INSULATION

A. General: Insulation and lining material shall meet requirements of flame spread not to exceed 25 and smoke developed not to exceed 50 as tested by Procedure ASTM-E-84, NFPA 255 or U.L. 723 and shall conform to NFPA 90A and 90B.

B. Heating and cooling duct and related heating and cooling equipment insulation shall conform to 2019 Building Energy Efficiency Standards, Administrative Regulations, Title 24, Part I, Section 120.4, except to the extent that this Specification supersedes the minimum standards as established by the Code, in which case this Specification shall take precedent.

C. Unless noted otherwise, insulation shall be Fiberglass, or approved equal material. Application Work shall be performed in accordance with the best accepted practice of the trade and the manufacturer's recommendations. The performance of insulation Work shall be by experienced insulation applicators. Insulation shall be installed after the specified tests have been applied to the piping and duct systems, and the systems have been inspected and approved. Fiberglass trade names and/or numbers have been used to establish a standard of quality.

D. External Duct Insulation – Outdoors, in a space between the roof and an insulated ceiling, in a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces, in an unconditioned crawlspace; or other unconditional spaces: Shall be applied to concealed heating and cooling, supply and return duct except duct that is internally lined. Insulation on duct shall be Manville Microlite FSK duct insulation, 3" thick, minimum installed R value of 8.0 or greater, FSK aluminum foil reinforced with fiberglass, scrim laminated to U.L. rated Kraft, or approved equal. Adhere to duct surfaces with Foster's 85-62 or approved equal, adhesive applied in strips of 6" wide on approximately 12" centers. Circumferential seams shall be butted together and sealed over joints with 3" wide pressure sensitive foil vapor barrier tape. Longitudinal edges shall be lapped 2" and secured with outward clinching staple 6" on center then sealed with pressure sensitive foil vapor barrier tape. Duct wrap shall be installed to allow maximum fullness at corners (avoid excessive compression) minimum thickness at corners shall be 1". Where ducts are over 24" in width, the duct wrap shall be additionally secured to the bottom of the rectangular ducts with mechanical fasteners spaced on 18" centers (Max.) to prevent sagging insulation.

E. External Duct Insulation – All other locations not listed above: Shall be applied to concealed heating and cooling, supply and return duct except duct that is internally lined. Insulation on duct shall be Manville Microlite FSK duct insulation, 2" thick, type 100, minimum installed R value of 4.2 or greater, FSK aluminum foil reinforced with fiberglass, scrim laminated to U.L. rated Kraft, or approved equal. Adhere to duct surfaces with Foster's 85-62 or approved equal, adhesive applied in strips of 6" wide on approximately 12" centers. Circumferential seams shall be butted together and sealed over joints with 3" wide pressure sensitive foil vapor barrier tape. Longitudinal edges shall be lapped 2" and secured with outward clinching staple 6" on center then sealed with pressure sensitive foil vapor barrier tape. Duct wrap shall be installed to allow maximum fullness at corners (avoid excessive

compression) minimum thickness at corners shall be 1". Where ducts are over 24" in width, the duct wrap shall be additionally secured to the bottom of the rectangular ducts with mechanical fasteners spaced on 18" centers (Max.) to prevent sagging insulation

F. Internal Duct Insulation - Outdoors, in a space between the roof and an insulated ceiling, in a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces, in an unconditioned crawlspace; or other unconditional spaces: Shall be applied to all heating and cooling supply and return duct and plenums on roof or where shown on Drawings. Manufacturer shall be Manville Microlite, or approved equal. Duct Liner shall be Linacoustic R, 2" thick, 1.5 pcf, with a "K" value of 2.2 in. for a total "R" installed value of 8.0 or greater. Insulation shall withstand velocities of up to 5000 FPM and temperatures up to 250 degrees F.

G. Internal Duct Insulation – All other spaces not listed above: Shall be applied to all heating and cooling supply and return duct and plenums where shown on Drawings. Manufacturer shall be Manville Microlite, or approved equal. Duct Liner shall be Linacoustic R, 1 ½" thick, 1.5 pcf, with a "K" value of 2.2 in. for a total "R" installed value of 4.2 or greater. Insulation shall withstand velocities of up to 5000 FPM and temperatures up to 250 degrees F

H. Portions of duct receiving Duct Liner shall be completed with transverse joints neatly butted with no gaps or interruptions. The duct liner shall be adhered to the sheet metal with 100% coverage of adhesive and exposed leading edges and transverse joints coated with adhesive. Adhesive shall be a water based product. In addition this shall be secured with mechanical fasteners which shall compress the liner sufficiently in place. The liner shall be cut to assure overlapped and compressed longitudinal corner joints. Application procedures shall comply with the recommendations of the Sheet Metal and Air Conditioning Contractor's National Association's Duct Liner Application Standard, Second Edition.

I. Ducts: Ducts shall be constructed, installed, sealed and insulated in accordance with the 2019 CMC. Insulation requirements are shown in 2019 California Energy Code T-24 Part 6 Section 120.4. The above paragraph(s) shall supersede if more stringent.

2.17 TEMPERATURE CONTROLS

A. Temperature controls shall be furnished as indicated in schematic Drawing on Plans including room thermostats, relays and other necessary combustion, operating and safety controls.

B. Wiring and Conduit

1. Control wiring and conduit shall be the responsibility of this section and be installed as follows:

a. In equipment rooms/attics – Conductors shall be run in conduit. Final connection to equipment shall be flexible conduit.

b. Concealed in building construction (wall/inaccessible ceilings) - Conductors shall be run in conduit.

c. Roof mounted/exterior equipment yards – Conductors shall be in conduit. All flexible conduit shall be seal-tite with weatherproof connections. Equipment on grade and detached from the building a distance greater than 36" shall have underground control conduit routed to equipment.

d. Above accessible ceiling spaces – Control cable will be allowed to be installed without conduit in accessible areas above ceilings as follows:

1. Cable is an approved type for the application.
2. Cable is bundled/organized in management devices routed square with building lines (no diagonals) and kept clear of electrical devices (i.e., ballasts, transformers, etc.) that could cause interference.
3. Conduit sleeves are provided between accessible ceiling spaces (i.e., across soffits, gypboard ceilings, etc.) as required to maintain future access to cable.

e. Cable routed in accessible ceiling spaces shall comply with EIA/TIA standards for communications cabling. Communication bus wire shall be W183C-2058Y Connect Air, yellow shielded cable.

C. Electric wiring, conduit and other electric devices required to complete the installation of the temperature control systems shall comply with requirements as set forth in the Electrical Section of this Specification.

D. After completion of the installation, the Contractor shall adjust thermostats, motors and other equipment provided under this Contract. He shall place them in complete operating condition subject to approval of the Architect.

E. The Control System herein specified shall be free from defects in workmanship and material under normal use and service. If, within twelve (12) months from date of acceptance by the Architect, any of the equipment herein described is proved to be defective in workmanship or material, it will be adjusted, repaired or replaced free of charge by the Contractor.

F. The final connections and supervision of control wiring and interlock wiring shall be the responsibility of this Contractor.

G. The Contractor shall submit to the Architect for approval, the required number of shop drawings of the entire control system before starting Work.

H. Upon completion of the Work, the Contractor will provide diagrammatic layouts of the Automatic Control Systems specified herein. Layouts shall show control equipment and the function of each item shall be indicated.

I. The temperature control system shall be installed by persons in the direct employment of the temperature controls manufacturer(s) exclusive contracting representative. The Mechanical Contractor shall not install the temperature controls unless pre-approved by the Mechanical Engineer.

2.18 REFRIGERANT PIPING

A. Refrigerant piping shall be flushed clean with nitrogen and the ends capped prior to installation. Refrigerant piping shall be ASTM B280 ACR copper tube with wrought copper fittings. Use 5% minimum silver brazing alloy with melting point higher than 1100°F for making the joints.

2.19 REFRIGERANT PIPING INSULATION

A. VRF and Heat Pump Systems:

1. Material:

a. Low-density EPDM closed cell elastomeric foam, CFC and HCFC gas free with over-lap seal

b. Thermal Conductivity: 0.235 (BTU * in/h *ft2 * °F) at 75°F.

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c. Water Vapor Permeability: <0.03 perm (4.38 x 10-11g/Pa*s*m) per ASTM E96.

d. Water Absorption: <0.2% by volume per ASTM C 209.

e. Working Temperature: -70 °F to 257 °F (-57 °C to 125 °C) continuous per ASTM C 411.

f. Surface Burning Characteristics: Meets 25/50 Flame-Spread/ Smoke-Generated per UL 723 and ASTM E84. Additionally, meets UL-94 5 V-A, V-0 and is self-extinguishing per ASTM D 635.

g. UV Resistant: EPDM provides UV Resistance in accordance with ASTM G7/G90.

h. Ozone Resistant: Meets ASTM D 1171

2. Title 24 Wall Thickness:

a. Hot gas pipes:

1. 2-1/2” wall thickness

b. Liquid pipes:

1. 1” wall thickness

c. Suction gas pipes:

1. 1” wall thickness for less than 1” pipe

2. 1-1/2” wall thickness for greater than 1” pipe

B. For insulation exposed to weather:

1. Provide protective PVC cover type “E-FLEX GUARD” (72 or 750 series) by Airex Manufacturing, Inc.

2.20 REFRIGERANT PIPING ACCESSORIES

A. Stop valves shall be Henry Type – rated for R410A, brass body, soldered, packless diaphragm.

B. Solenoid valves shall be Sporlan Type – rated for R410A, soldered with brass body.

C. Filter dryer shall be Sporlan "Catch-All" with soldered connections.

D. Flexible connectors rated for R410A shall be used at seismic joints. For linesets up to 5/8”, flexible connectors shall be 36” Flex-Line Connectors manufactured by DiversiTech Corporation. Contractor to provide nitrogen purge and cleaning of complete assembly prior to installation.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 COORDINATION

A. Coordinate as required with other trades to assure proper and adequate provision in the Work of those trades for interface with the Work of this Section.

3.3 PREPARATION

A. Holes in concrete:

1. Provide sleeves, accurately dimensioned and shaped to permit passage of items of this Section.

2. Deliver such sleeves, with accurate setting drawings and setting information, to the trades providing the surfaces through which such items must penetrate, and in a timely manner to assure inclusion in the Work.

B. Flashing:

1. Where items of this Section penetrate the roof, outer walls, or waterproofing of any kind, provide under this Section base flashing and counterflashing required at such penetration.

2. Provide on each pipe passing through the roof a 4 pound seamless lead flashing and counterflashing assembly.

3.4 GENERAL INSTALLATION REQUIREMENTS

A. Conceal piping, ductwork, and equipment in spaces provided unless specifically shown otherwise. If spaces are inadequate, notify Architect in time to avoid unnecessary Work. Do not cut or notch structural members without specific approval of the Architect.

B. Follow manufacturer's instructions on items not specifically covered in drawings and specifications. Report discrepancies to Architect for clarification before starting Work.

3.5 EQUIPMENT INTERFACE

A. Provide required shut off valves, unions, and final connections of piping to the Work of this Section.

B. For electrically operated equipment, verify the electrical characteristics actually available for the Work of this Section and provide equipment meeting those characteristics.

3.6 PAINTING

A. Paint inside of air outlets and connecting plenums with one coat of black paint, or provide all such items factory prepainted.

B. For roof-mounted equipment, provide factory pre-finish on exposed surfaces.

C. Touch-up scratches and abrasions to be invisible to the unaided eye from a distance of 5 feet.

3.7 INSTALLATION OF DUCTWORK

A. Ductwork shall be delivered to the Project site with surfaces clean and free of loose dirt and rust. Special care shall be exercised by the Contractor to store the duct in a clean area to prevent the accumulation of dirt prior to installation. Fabricated or partially fabricated duct sections shall not be stored in open fields or on dirt areas surrounding the construction site. Paved areas may be used, if available, provided adequate protection is provided to prevent the accumulation of dirt on duct surfaces. If possible, the Contractor should arrange to deliver duct to the project site and store on the floor of the area in which it is to be installed.

B. Before installation of ductwork, the Contractor shall inspect each section of duct and wipe internal surfaces clean. At the end of each Work period, or when ends of duct are left installed for future extension, the open ends shall be tightly closed off with a plastic sheet and taped securely to the open end of the duct.

C. Construct and install sheet metal in accordance with latest SMACNA recommendations. Provide variations in duct size and additional duct fittings as required and approved by the Architect at no extra cost to the owner.

D. The throat radius of bends shall be 1-1/2 times the width of the duct. Provide turning vanes in any mitered turn greater than 45 degrees.

E. Transition slopes shall be no less than one to five where space permits.

F. Abrupt offsets in the duct system greater than 30 degrees will not be allowed.

3.8 TEMPERATURE CONTROL INSTALLATION

A. Install wiring and tubing parallel to walls and floors and securely clipped to structure or mechanical system components. Group parallel runs for neat appearance.

B. Install room thermostats and other control devices at 48 inches above finished floor unless a lower mounting height is required for access by handicapped.

C. Install outside air sensor in a location where it is not directly effected by radiation from the sun or any heat generating device or by a conditioned air stream or any other location that would produce a false reading.

D. Upon completion of the installation calibrate all equipment and adjust controls for proper operation.

3.9 REFRIGERANT SYSTEM CHARGING PROCEDURE

A. Pressurize the system with refrigerant and hold for 24 hours with no drop in pressure; test joints and equipment for evidence of leaks after satisfactory pressure test.

B. Provide 1/2" angle type charging and purging valves adjacent to high and low side of the condensing unit to accomplish the procedure described hereinafter. Connect the vacuum pump to both the high and low side of the system. Do Work when ambient air temperature is above 60 degrees F during the evacuation process.

C. Operate the vacuum pump until the system is evacuated to 2.5 mm Hg absolute. Break the system vacuum with nitrogen or refrigerant.

D. After the system has been evacuated to 2.5 mm Hg absolute, close the vacuum pump suction valve and stop the pump.

E. Charge system to required capacity with specified refrigerant.

3.10 CONTROL DEVICE IDENTIFICATION LABELS

A. Thermostats and Exhaust fan switches shall have labels mounted on or just above the control device labled with the equipment being controlled. As an example, for a exhaust fan controlled by a switch the lable would read “EXHAUST FAN # 1” or if a thermostat the label would read “AC-1”.

1. Labels shall be 2" x 1" x 1/8" thick Formica/plastic engraving stock beveled on both sides and with two 3/16" diameter holes near the top uppermost tag corners.

2. Labels shall be white with 3/8" high red engraved letters.

3. Labels shall be attached to the equipment with adhesive.

3.11 WARRANTY

A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or owner.

3.12 SHOP DRAWINGS

A. The Contractor shall prepare shop drawings covering mechanical duct systems, equipment, and piping systems. The drawings shall be prepared electronically at 1/4" / ft scale minimum (or greater as needed for clarity or as requested by the Architect or Mechanical Engineer) and shall include sections, elevations, and dimensions in relation to the building structure and other trades as required to demonstrate coordination with all other disciplines and trades on the project.

B. Shop drawings are to be submitted to the Architect for approval per the Submittals requirements of this section prior to any fabrication.

3.13 MECHANICAL SYSTEM START-UP RESPONSIBILITY

A. Start up Mechanical Systems, and perform any such Work as may be required to adjust the systems to meet the requirements of the Contract Documents.

B. Install new clean specified filters in equipment containing filters immediately prior to owner occupancy. Contractor to bear all costs for this work.

3.14 MECHANICAL SYSTEMS BALANCING

A. Testing and air balancing shall be performed by an independent balancing company certified by Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB) or other ASHRAE recognized TAB specific certification. Testing and balancing shall be performed by a company other than the mechanical system installers/contractor. Service provider credentials to be included with project submittals for approval by the Mechanical Engineer.

B. After Systems have been tested as outlined, air and water flow rates shall be balanced, and control devices adjusted. Balance and testing shall not begin until systems have been completed and are in full working order. Upon completion of the balancing operation and prior to final acceptance of the systems, the balancing firm shall submit a report, per the Submittals requirements of this section, certifying to the proper performance of the system for approval by the Mechanical Engineer.

1. The following information shall be included in the Air Side Report:

a. Fan speeds.

b. Motor current readings and voltage readings.

c. Air quantities in CFM at supply, return, exhaust terminals, and outside air intakes, both at design value and actual measured value. Test and adjust each terminal to within +10% of design requirements.

d. Air velocities in FPM at supply, return, and exhaust terminals at design value and actual measured value.

e. Positive static pressure, negative and total pressures and total air quantities for each fan system.

f. Equipment nameplate data.

END OF SECTION 23 00 00

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SECTION 23 00 13

GENERAL MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Related Documents:

1. The other Contract Documents complement the requirements of this Section.
2. Division 1 - General Requirements applies to the Work of this Section.
3. Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

B. Codes and Regulations:

1. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.

C. Included: Work includes, but is not limited to the following:

1. Heating, Ventilating, Air Conditioning and System Balancing
2. Plumbing
3. Fire Protection
4. Carpentry and metal Work required for Work of this Section and not specifically shown under another Section. Openings in concrete or masonry construction shall be either core drilled or saw cut unless indicated otherwise on Drawings.
5. Excavation and Backfill
6. Coordination Drawings

D. Related Work:

1. Painting (Division 09)
2. Cutting and Patching (Division 30)
3. Low voltage electrical control (Division 26)

1.2 DEFINITIONS

A. Furnish: Purchase and deliver to job site in new condition.

B. Install: Receive and store at job site until required; place secure and connect; furnish required appurtenances.

C. Provide: Furnish and install as defined above.

D. Section: Refers to a Section of these Specifications.

E. Standards: The issue in effect as of the date of the contract documents.

1.3 PROJECT RECORD DRAWINGS

A. Comply with pertinent provisions of Architectural Sections (Division 01).

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1.4 SERVICE INTERRUPTIONS

A. When Work of this Section requires temporary shutdown of existing systems for connections, the shutdown shall be made only during pre-arranged time agreeable to the Owner.

1.5 CORRELATION, INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS

A. The Mechanical Drawings are, in general, made to scale and the Contractor may obtain approximate distances and dimensions by scaling the Plans. It is distinctly understood, however, that it is done entirely at the Contractor's responsibility. Refer to Architect's Plans and Specifications for construction details, which will affect the Work and equipment. Examine the Architectural, Civil, Structural, Mechanical, Electrical, Landscape, Irrigation, Data, Fire Protection and Plumbing Plans and Specifications to ensure that this work does not conflict with the above trades. Plumbing, Mechanical and Electrical Plans are diagrammatic and, therefore, do not necessarily represent the exact installation. However, pipe sizing for utility services and ductwork are calculated per their respective codes and Standard Engineering Practice and shall be installed as sized from point of origin to terminal point. It shall remain the Contractor's responsibility to submit Shop Drawings if he/she has any questions about the final arrangement. Nothing on these Plans or Specifications shall be construed to permit work not conforming to all applicable codes and regulations.

PART 2 - PRODUCTS

2.1 ACCESS PANELS

A. If not called for under other Sections, furnish Milcor, Elmdor, or Jay R. Smith access panels where shown on the Drawings or required for maintenance access to completed Work of this Section. Submit size, type, and location of proposed access panels not specifically shown, for review by Architect.

B. Access panels shall be constructed of 16 gauge prime coated steel or stainless steel with screwdriver operated cam latch, concealed hinges, and fire rating equal to adjacent construction.

C. Provide flush type doors with:

1. Stainless steel finish for tiled surfaces.

2. Prime coated finish for other surfaces.

2.2 FLASHING

A. Provide watertight flashing at all openings through exterior walls and roof. Refer to Architectural Drawings.

2.3 BELT DRIVES

A. All belts shall be "Vee" type, or approved equal. Sheaves shall be adjustable and shall be sized to drive fan at scheduled RPM when set at midpoint of adjustment range. All belt drive assemblies shall be rated at 150% of drive motor horsepower. OSHA approved belt guards shall be provided over all drive assemblies. The Contractor shall change any belts and drives as required to produce the specified CFM.

2.4 VIBRATION ISOLATION AND NOISE CONTROL

A. All fans, heating and ventilating units, air conditioning units, blowers and similar equipment shall be securely mounted to and/or supported from the structure.

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B. Isolate all bare water piping from structural members or hangers with "Trisolators" or submitted and approved equal insulating sleeves. Install hangers on outside of insulated jacket on all insulated lines.

2.5 WEATHERPROOFING

A. All equipment exposed to weather shall be protected by means of a suitable finish (i.e. paint). All fan cabinets, roof-mounted equipment, and ductwork shall be fabricated in such a manner to prevent leakage through seams and joints. Water rated, exterior hoods shall be provided over motors, belts, and other devices to insure against damage by water. At all locations where pipes and/or ducts penetrate exterior walls, or roofs, suitable rain tight flashing shall be provided.

2.6 PIPE WRAPPING

A. All pipe, metal components, and joints buried in ground shall be primed and protected with 10-mil tape double wrapped or approved equal per IAPMO IS 13-2006. Before tape application, all bare pipe and fittings to be wrapped must be coated with pipe wrap primer. Stretch first layer of tape to conform to the surface while spirally half-lapping, apply a second layer, half-lapped and spiraled as the first layer with spirals perpendicular to first wrapping. In lieu of tape wrap, heat shrinkable 10-mil minimum thick polyethylene sleeve may be used.

B. When applying tape, use only enough pull to cause the tape to properly conform to the irregular surfaces of the item. The proper amount of pull is reached when the tape surface is smooth without any wrinkles. Continue tape 4" above grade. End overlaps should point down. Tape shall be applied per manufacturer’s installation instructions.

2.7 ELECTRIC MOTORS AND ELECTRICAL DEVICES

A. All Electric motor current characteristics are as shown in equipment schedules on drawings and as specified hereinafter in this Specification. The Contractor shall refer to the Electrical Plans and shall confirm all motor voltage, amperage and phase characteristics before processing submittals or ordering equipment. If any equipment is installed different from the supplied electrical power, it is the contractor’s responsibility to correct equipment to the required electrical characteristics.

B. All electrical devices of a type normally listed by Underwriters Laboratories, Inc. shall bear U.L. label of approval.

2.8 PAINTING AND FINISHING

A. Provide the coating specified below unless otherwise specifically called for under Painting, Division 09900. Exclude non-ferrous items, stainless steel, items to be insulated, and factory-finished items. Conform to requirements of the Painting Section where requirements are not specified in this Section.

B. All materials used, except as otherwise specified in carrying out the provisions of the contract, are to be Fuller-O’Brien manufacturer or approved equal. Numbers given below are Fuller-O’Brien Company designation unless noted otherwise.

1. Primer coat for all exterior and interior materials: 1 Coat - Primer #66850

2. Finish coats as listed below:

Interior of Grilles, Diffusers, and Registers	1 Coat – Flat (black) #31202

3. Furnish equipment with factory or field-applied prime coat and finish coat of enamel. Restore damaged finishes to match original.

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PART 3 - EXECUTION

3.1 GENERAL EQUIPMENT INSTALLATION REQUIREMENTS

A. Install equipment to provide neat appearance, required manufacturer's access, and required space to allow replacement or maintenance. Provide bases, supports, anchor bolts, and other items required to install equipment. Installation shall be level and braced per CBC.

B. Equipment shall operate quietly and without objectionable vibration. Excessive vibration, other than from specified equipment operating at optimum conditions, shall be the Contractor's responsibility and shall be eliminated as directed by Architect.

3.2 COORDINATION OF WORK

A. Coordinate Work of this Section with Work of other Sections to avoid conflicts. If required, provide shop drawings and submit to Architect for approval.

B. Insure that Work of other Sections is suitable to accommodate Work of this Section.

3.3 ADEQUACY OF FURRING

A. Conceal piping and ductwork in spaces provided unless specifically shown otherwise. If spaces are inadequate, notify Architect prior to ordering materials and fabrication of components.

3.4 PROTECTION AND CLEANING

A. Protect equipment from dirt, moisture, and mechanical damage during construction. Restore or replace damaged equipment to original condition.

B. Keep interior of piping and ductwork free of foreign material during construction. Flush piping systems with test medium specified under Piping Tests before installing equipment and appurtenances or making final connections.

3.5 CLOSING-IN OF UNINSPECTED WORK

A. Do not conceal or cover Work before tests and observations are completed. Uncover Work prematurely closed in and repair resulting damage to all Work, if requested by Architect, Engineer, or Project Inspector.

3.6 DAMAGE

A. Repair or replace items damaged by leaks or overflow from Work provided under this Section and for any damage to any part of the project site, for a period of 1 year after notice of completion date. This is in addition to and not a limitation of other rights the Owner may have against the contractor under the Contract Documents.

3.7 PAINTING AND FINISHING

A. Exposed piping, ducts, and mechanical equipment (except for factory finished items) shall be painted. Exposed piping, except for identification banding, shall be painted to match surfaces adjacent or per Architectural specifications. Each coat to be inspected when dry and subsequent coat not to be applied until approval received.

B. Paint all surfaces visible through grille, diffuser and register faces, flat black.

C. The contractor shall store all painting materials and equipment outside of the building. The receiving and moving of all paint materials and mixing shall be done outside of the building. Any other arrangements shall be made only with Architects approval.

D. All necessary precautions shall be taken to prevent fire. Rags, waste, etc., soiled with paint or cleaning material, shall be removed from the premises at the end of each day's work.

3.8 MECHANICAL SYSTEM TESTING

A. Furnish all test pumps, gauges, and equipment. Test all safety controls and devices.

B. For air tests, install a calibrated test pressure gauge in the piping system to observe any loss in pressure. Calibrate the test pressure gauge with a dead weight tester within 15 days before use and certify by initial and date on a sticker applied to the dial face. Maintain the required test pressure for the time indicated. Brush joints with a soapy water solution to check for leaks if the required pressure cannot be maintained.

C. After any test, repair all leaks found as directed and re-test as necessary until the system is proven tight.

D. Before applying test pressure to any piping systems the Contractor shall be responsible for isolating all equipment e.g. control valves, regulators, relief devices, tanks and any other line accessories, which would otherwise be damaged by the test pressure.

1. Soil, Waste, Vent, Roof, and Condensate Drainage:

   a. Entire System: Tightly close all openings except the highest one. Fill to overflowing with water.

   b. Sections of System: Tightly close all openings except the highest opening of the section under test. Fill section with water to test each section with a minimum 10-foot head of water except for the uppermost 10 feet of the system.

   c. Allow to stand for (4) hours or longer, as required to complete the inspection.

2. Domestic Water: Fill with water and test at 150 psig. Retain for (4) hours.

3. Gas Piping: Air test to pressure equal to one and one-half times the design pressure, but in no case less than 50 psig. Retain for four hours.

4. Refrigerant: Pressurize the system with nitrogen to 150 psig and hold for 24 hours with no drop in pressure; test joints and equipment for evidence of leaks after satisfactory pressure test.

E. After all Systems have been tested as outlined, all flow rates shall be balanced, and all control devices adjusted. See Section 23 00 00.

F. The equipment and installations shall be operated by the Contractor and he shall demonstrate that all Systems are performing according to the requirements of the Plans and Specifications and to the satisfaction of the Architect, Engineer and Owner.

G. Acceptance Testing Requirements: For applicable mechanical acceptance tests see the T-24 plan sheets. All forms, regulation and requirements are available online at www.energy.ca.gov/title24.

3.9 CUTTING AND PATCHING

A. The Contractor shall do all cutting and patching which may be required for the installation of the Work under this Division of the Specifications. Patching shall be of the same quality, materials and finish as, and shall match accurately, all surrounding construction. No cutting of the Structure shall be permitted without the approval of the Architect.

B. Wherever concrete or paved surfaces are cut to provide for the installation under this Section, the Contractor shall restore the surfaces to their original condition. Subgrade materials, concrete, and paving materials, along with the placement of same, shall be in accordance with the respective Sections of this Specification as they apply to the installation of such material.

3.10 EXCAVATION AND BACKFILL: (Buried pipes within the building walls and to 5 feet from the building.)

A. Dig trenches straight and true to line and grade; bottom shall be left smoothed of rock points. Pipe shall be supported for the entire length on undisturbed, original earth. The minimum trench width shall be 16" and all pipe shall be 2 feet below the finished grade, minimum, wherever conditions permit. Sewer pipes to be below grade a s necessary to meet the slope and invert on the Drawing. Whenever substantial variations of pipe bury is indicated by field conditions, the proposed changes in depth of bury shall be submitted, in writing, to the Architect for approval.

B. Installation of Thermoplastic Pipe and Fittings: Trench width for thermoplastic sewer pipe shall be 1.25 times the outside diameter of the piping plus 12 inches or the outside diameter of the piping plus 16 inches. Thermoplastic piping shall be bedded in not less than 4 inches of granular fill supporting the piping. The backfill for thermoplastic piping shall be compacted along the sides of the piping in 6 inch layers and continue to not less than 12 inches above the piping. Compaction shall be not less than a 85 percent standard proctor density.

C. All piping shall be laid on a bed of clean dry sand not less than 6" thick. The space between the pipe and the sides of the trench shall be backfilled with clean dry sand to a point 6" above the crown of the pipe. Both sides of the pipe shall be filled at the same time.

D. The remainder of the trench shall be backfilled with native soil in lifts no greater than 12" and shall be mechanically compacted by tamping so to maintain a minimum relative dry density of 95%, determined by California Impact Test Method No. 216.

E. All backfilling shall be brought flush with finished subgrade.

F. Excess material shall be removed from the site. Trenches shall be backfilled immediately after approval.

3.11 EXCAVATION AND BACKFILL: (Buried pipes beyond 5 feet from the building walls.)

A. The Contractor shall excavate for the installation of underground plumbing piping, and shall perform all Work to accomplish required excavation. Should it be required to cut asphalt pavement, such pavement shall be sawed or cut, to a depth necessary to bring about a straight-line break parallel to sides of the trench, so as not to disturb the adjoining pavement. All Work during its progress and after its completion shall conform truly to lines and grades given by the Architect.

B. The width of the trench shall not be less than twelve (12") inches, no more than twenty-four (24") inches greater than the outside diameter of the barrel of the pipe to be laid therein. Where sheeting is required, this width shall be increased by the thickness of the sheeting.

C. Installation of Thermoplastic Pipe and Fittings: Trench width for thermoplastic sewer pipe shall be 1.25 times the outside diameter of the piping plus 12 inches or the outside diameter of the piping plus 16 inches. Thermoplastic piping shall be bedded in not less than 4 inches of granular fill supporting the piping. The backfill for thermoplastic piping shall be compacted along the sides of the piping in 6 inch layers and continue to not less than 12 inches above the piping. Compaction shall be not less than a 85 percent standard proctor density.

D. Should the trench be excavated to a greater depth than that given by the Architect, the Contractor shall bring such excavation to the required grade with such material as the Architect may designate, notwithstanding that it may be necessary to bring such material from other localities or to purchase suitable material; and the trench shall be tamped, as directed by the Architect. The required work shall be at the Contractor's expense, with no additional time.

E. The material excavated shall be deposited along the side of the trench in such a manner as to create the least inconvenience possible.

F. Special care shall be taken to have all fire hydrants and gate valves on water mains kept accessible at all times. The Contractor shall not obstruct the gutter or any street or driveway, but shall use all proper means to provide for the free passage of surface water along the gutters into storm water inlets. He shall provide channels where necessary, suitable to the Architect.

G. Wherever required, the side of the trench shall be sheeted and braced in strict accordance with the rules, orders, and regulations of the Division of Industrial Safety of the State of California. If water or quicksand is encountered, it may be necessary to sheet the trench solid with the type of sheeting suitable to the Architect.

H. The Contractor shall cooperate with the Architect and maintain access to all areas required by the Architect. The Contractor shall be liable for all damages suffered by the Architect resulting from the contractor's negligence or lack of cooperation.

I. Excess earth from the trenches, after compacting, shall be removed and disposed of by the Contractor unless otherwise directed by the Architect.

J. Where groundwater or soft, yielding or otherwise unsuitable material is encountered in the bottom of the trench, which in the opinion of the Architect is an unsuitable foundation for the pipe, such material shall be excavated from the full width of the trench to a depth satisfactory to the Architect. Said depth shall be a minimum of six (6") inches. The resulting space shall be backfilled with imported bedding properly compacted to give adequate pipe support.

K. All piping shall be laid on a bed of clean dry sand not less than 6" thick. The space between the pipe and the sides of the trench shall be backfilled with clean dry sand to a point 6" above the crown of the pipe and both sides of the pipe shall be filled at the same time.

L. The remainder of the trench shall be backfilled with native soil in lifts no greater than 12" and shall be mechanically compacted by tamping so as to maintain a minimum relative dry density of 95% as determined by California Impact Test Method No. 216.

M. Any asphalt pavement cut for the purpose of installing underground piping shall be replaced and shall conform in kind and quality to the type of pavement removed, but, in no case less than 12" of base rock be placed beneath the pavement. Where plant mix or asphalt concrete surfacing exists, pavement shall not be less than 3" in thickness unless otherwise authorized by the Architect.

3.12 INSTALLATION OF PIPING, DUCTWORK AND EQUIPMENT

A. The installation of piping, ductwork, and equipment shall be made in such a manner to clear beams and obstructions. Do not cut into or reduce the size of plates or any load carrying members without approval of the Architect. Check Drawings and Work of others to prevent interference. Deviations of the Work determined by the Architect shall be installed by the Contractor without additional cost.

B. Install piping and ductwork promptly, cap or plug open ends of pipe. No piping shall be permanently covered by construction before inspection and approval. Piping and ductwork shall be installed in accordance with best practice and recommendations of the manufacturer.

C. Conceal piping and ductwork unless indicated otherwise. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions. Remove defective material from site. Install piping generally level, free of traps and unnecessary bends to conform with building requirements, and provide space for other work. Piping to be free of unusual

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noises. Avoid any possible galvanic action by isolating dissimilar metals with suitable Dielectric Insulating Fittings.

D. Unless called for otherwise, hereinafter in this Specification or by specific detail on the Drawings, all water pipes in contact with structure and/or hangers shall be suitably isolated. In the case of uninsulated pipe, "Trisolators" or equal shall be used.

E. Protect enameled or polished equipment from damage, tool marks, etc.

3.13 STERILIZATION OF PIPES

A. After preliminary purging of the Systems, the entire domestic potable water system pertaining to Work under this Contract shall be chlorinated in accordance with American Water Works Association, State of California Health and Safety Code procedure for disinfecting water mains. A thorough flushing operation shall be run upon completion of sterilization. Contractor shall then arrange with local health authority for test on mains and water systems and provide three (3) copies of test results to the Architect.

3.14 EQUIPMENT IDENTIFICATION TAGS

A. Major pieces of equipment shall include, but are not limited to: water heaters, air conditioners, unit heaters, supply and exhaust fans, and shall be tagged.

1. Tags shall be 2" x 2" x 1/8" thick Formica/plastic engraving stock beveled on both sides and with two 3/16" diameter holes near the top uppermost tag corners.

2. Tags shall be white with 3/8" high red engraved letters.

3. Tags shall be attached to the equipment with bolts, screws or chains as per valves.

4. Tags shall have the following information:

a. Equipment number and nomenclature corresponding to the information on the mechanical contract drawings, and where multiple systems are installed in a building, equipment tagging shall include the space or area served.

b. Examples:

WATER HEATER	EXHAUST FAN	AIR CONDITIONER
WH-1	EF-2	AC-3
FIRST FLOOR	KITCHEN 101	2ND FLOOR OFFICE - EAST

3.15 IDENTIFICATION OF PIPING SYSTEMS

A. Building Systems:

1. Piping systems installed anywhere within the scope of the Work shall be identified as to contents using a color banding and marking system as outlined and in compliance with Federal OSHA requirements.

2. This Work includes furnishing and application of all snap-around and/or self-sticking pipe markers. Formica valve tags, chains, wires, and related materials proper for the completion of the Work.

3. Pipe markers shall be permanently shaped vinylite plastic snap-around pipe markers as manufactured by Seton Nameplate Corporation, Wilmington Plastic Company, or approved equal.

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4. A maximum of four basic background colors shall be used and they shall conform to the American Standards Association Standard A13.1, "Scheme For Identification of Piping Systems" The names of materials (pipe contents) shall be superimposed on these ANSI background colors. Work legends shall conform to ANSI A13.1 to avoid confusion and mistakes. Basic background colors and content classification are:

Yellow	Dangerous Materials
Red	Fire Protection
Bright Blue	Protective Materials
Green	Safe Materials

5. Pipe marking and installation shall be as follows:

   a. Apply "Plastic Pipe Marker" at each valve to show proper identification of pipe contents.

   b. Use an "Arrow Marker" with each "Pipe Content Marker". The Arrow shall always point away from the "Pipe Marker" and in the direction of the flow.

   c. If flow can be in both directions, use a double-header "Arrow Marker".

   d. Apply "Pipe Marker" and "Arrow Marker" at every point of pipe entry and exit where the line goes through the wall, floor or roof.

   e. Apply "Pipe Marker" and "Arrow Marker" on each riser and "T" joint.

   f. Apply "Pipe Marker" and "Arrow Marker" every 50 feet on long continuous lines.

   g. Identifying long continuous lines with "Pipe Marker and "Arrow Marker at every bay or aisle within the building. All branch runs from mains on the roof shall be identified with "Pipe Marker" and "Arrow Marker" at the point of takeoff.

   h. Apply "Markers" on the two lower quarters of the pipe where view is unobstructed. In this position "Markers" are read at a glance from ground floor level and dust will not obscure the "Marker". Roof-mounted piping "Markers" shall be so located that they can be read from a standing position on the roof.

   i. All identification markers located out of doors and exposed to the sun and the elements shall receive one coat of clear lacquer after application to the pipe, to seal edges and to act as a protective coating.

   j. Each "Arrow Marker" must have the same ANSI background color as its companion "Pipe Marker". Arrow must point away from "Pipe Marker" and indicate direction of flow.

   k. "Pipe Markers" shall be guaranteed to stay on pipe systems for a period of not less than five years.

6. Following is a list of, but not necessarily limited to, the more commonly used piping systems that require identification "Pipe Markers" and "Arrow Markers".

Abbreviations on Drawings	Wording to Put on Pipe Marker	ANSI Color Background
RL	Refrigerant Liquid	Yellow

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RS	Refrigerant Suction	Yellow
RG	Refrigerant Hot Gas	Yellow
All lettering shall be black on the yellow background and white on all other background.		

3.16 SEISMIC BRACING

A. It shall be required that pipes, ducts and conduits be supported and braced per the most current edition of SMACNA "Seismic Restraints Manual Guidelines for Mechanical Systems".

B. When the SMACNA "Seismic Restraint Manual Guidelines for Mechanical Systems" does not specifically address the size of duct or pipe to be braced, the following shall apply:

1. All ducts shall be braced and guyed to prevent lateral or horizontal swing to the satisfaction of the Architect, Engineer, and State Inspector.

2. All pipes shall be braced and guyed to prevent lateral or horizontal swing to the satisfaction of the Architect, Engineer, and State Inspector. Absolutely, no "Plumber's Tape" shall be used anywhere on this project.

C. The SMACNA Manual can be obtained through SMACNA online. Contractor shall obtain manual prior to the start of any work.

3.17 OPERATION AND INSTRUCTION

A. The Contractor shall furnish competent Technicians to supervise start-up operations of equipment specified by the Architect or Engineer and to instruct Owner's operators. The Contractor shall furnish six complete sets of operating instructions and service manuals to the Architect.

B. Instruction period shall be started after instruction books and service manuals have been submitted to and approved by the Architect and shall be at hours (regular and non-regular) arranged by the Architect.

C. Service manuals shall include oiling, cleaning, and servicing data, compiled in clearly and easily understood form and in a durable binder. Data shall show all serial numbers of every piece of equipment and complete list of replacement parts.

3.18 WARRANTY

A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or Owner.

END OF SECTION 23 00 13

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SECTION 23 09 00

MECHANICAL CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION:

A. The intent of this document is to describe a system that is complete in every respect without further cost to the Owner. Anything not shown on the drawings or indicated in the specifications, and required for complete operating systems, shall be included as part of this Work. This will also include all connections to new services.

B. All parts of the plans and specifications fully apply when applicable to work of this Division. No attempt has been made to divide the work between the various trades or subcontractors.

1.2 CONTROL CONTRACTOR QUALIFICATIONS:

A. Controls contractor shall be a currently authorized ” **TC-PRO and Honeywell BCS (Building Controls Specialist)** certified dealer at time of bid. Certifications shall be submitted with bid. No Exceptions. Contractor shall provide certificate from a Honeywell ASD (Authorized Systems Distributor), stating authorization of installing such systems in this geographic area. No Exceptions. Contractor shall have a minimum of three networked systems with proposed manufactures product already installed within a 75-mile radius of project site.

B. The manufactures authorized Honeywell Controls ASD “WEBS-8000” distributor for this geographical territory shall approve all programming algorithms.

C. Mechanical contractor shall assume full responsibility for accepting bids from contractors meeting this qualification.

1.3 CONDUIT AND WIRING

A. Control Contractor shall provide and install all low voltage conduit and wiring for DDC system as required for a complete and operating system. Conduit and wiring shall conform to Division 16 requirements.

1.4 CODES, STANDARDS, ORDINANCES AND REGULATIONS:

A. All work and materials shall be in full accordance with the latest rules and regulations of applicable codes as amended and adopted by any governmental agency which has jurisdiction over this work. Nothing in these Plans or Specifications is to be construed to permit work not conforming to these codes. Should the Plans or Specifications call for material, methods, or construction of a higher quality or standard than required by the above rules, the higher quality shall govern.

B. When not contradicting the above, the manufacturers' recommendations along with applicable parts of the following documents shall be the basis for quality and technique of installation.

1. Title 24, California Administrative Code, all parts.
2. Applicable publications of the National Fire Protection Association (NFPA), and the National Electrical Code (NEC).
3. Applicable publications of the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE).

1.5 SITE CONDITIONS AND LOCATIONS:

A. The general location and arrangement of system hardware is shown on the drawings. Information on the drawings relative to existing services is approximate only. Minor adjustments required to conform to actual locations shall be made without additional cost to Owner. The Contractor shall, as work progresses, verify the dimensions of the spaces

available for the installation of the work and he shall assume full responsibility for the proper locations of each portion thereof.

B. The construction documents are generally diagrammatic and the locations indicated may be approximate only. They do not show every offset, bend, or elbow required for installation in the space provided. The Contractor, therefore, shall install all equipment, conduit runs and the like as follows:

1. Adhere to the location indicated as near as possible.
2. Maintain ample head room and access in all passageways, clearance around all equipment and under conduit runs for unrestricted passage and for easy servicing of all apparatus, equipment, devices and the like.
3. Provide access for maintenance of all equipment.

1.6 SUBMITTALS:

A. Control Submittal: Within 30 calendar days after award of the contract, and before any materials of this Section are delivered to the job site, submit:

1. Complete materials and equipment list with manufacturers' literature on all items proposed to be furnished and installed under this Section.
2. Product data submittals must be complete and in a single bound document for all items supplied in this Division. Each document shall be bound with an index and marked with the equipment identification as specified in the Plans and Specifications.
3. Provide complete control shop drawing including equipment, control devices, point to point connections with terminal numbers, and any details necessary for a complete control drawing.
4. List of name plates to be engraved, showing each name plate wording and location.

B. Record Documents:

1. During progress of the work, maintain an accurate record of all changes made in the systems from those shown on the drawings, specifications and submittals.
2. Revise Shop Drawings and provide on reproducible media and in DXF format compatible with MS DOS operating systems and Autocad R-14.

C. Owner's Manual: Upon completion of the work, a complete bound book containing the following information shall be submitted to the Architect:

1. Complete catalog and performance data on all control devices, including all documents included in submittals.
2. Complete manufacturers' operating and maintenance instructions on all control devices.
3. Complete wiring and control diagrams for all equipment and systems, including list of materials, description of operation and system flow diagrams.
4. Manufacturers' warranty certificates on all equipment.
5. Contractor's warrantee letter.

1.7 OPERATION:

A. The Owner may require operation of parts or all of the installation for beneficial occupancy prior to final acceptance.

1.8 GUARANTEE:

The Contractor shall warrantee in writing all work performed under this contract for a period of one year from the date of notice of completion.

When notified of a system failure relating to the work performed under this contract, the contractor will be responsible for all investigation, diagnoses, repair, revision or replacement necessary to correct the condition.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT DESCRIPTION

A. The Building Automation System (BAS) shall be capable of integrating multiple building functions, including equipment supervision and control, alarm management, energy management, and trend data collection. System shall be Honeywell Controls WEBS-N4 based front end with Honeywell Controls devices and controllers. Other privately branded JACE devices are not accepted. BACnet, Lon and Modbus drivers shall reside in controller. OPEN NIC Statements – All Niagara 4 software licenses shall have the following NiCS: "accept.station.in=*"; "accept.station.out=*"and "accept.wb.in=*"and "accept.wb.out=*". Programming of the WEBS-N4 supervisory controller and creating all required dynamic graphics shall be included in this section.

B. The BAS shall consist of the following:

1. Local Display Devices.
2. Distributed User Interfaces
3. Network processing, data storage and communications equipment
4. DDC Controllers (HVAC etc)
5. Other components required for a complete and working BAS.

C. The system shall be modular in nature, and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, ASCs, and operator devices.

D. System architectural design shall eliminate dependence upon any single device for alarm generation and control execution. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.

E. Acceptable Systems

1. WEBS-8000 by Honeywell Controls is owner standard.
2. No others allowed.

2.2 BAS ARCHITECTURE:

A. Automation Network

1. The automation network shall be configured as a Client/Server network with a web server operating on the Clients LAN/WAN. The web browser interface is extended over the LAN/WAN. Monitoring and control of the BAS is available using the web browser interface.
2. The automation network shall include the option of a PC industry standard of Ethernet TCP/IP. Where used, LAN controller cards shall be standard “off the shelf” products available through normal PC vendor channels.
3. The BAS shall network multiple user interface clients, system controllers and systems supervisors(s) as required for systems operation.
4. The automation network option shall be capable of operating at a communication speed of 10/100 Mbps.
5. The automation network option will be compatible with other enterprise-wide networks. Where indicated, the automation network shall be connected to the enterprise

network and share resources with it by way of standard networking devices and practices.

B. Control Network

1. The communication protocols utilized for peer-to-peer communications between NAC's will be Niagara 4 with Fox, BACnet TCP/IP and SNMP and shall operate at a minimum communication speed of 9600 to 76,800baud. Use of a proprietary protocol for peer-to-peer communications between NAC's shall not be allowed.

2. Digital Controllers shall reside on the control network.

C. Integration

1. Hardwired

a. Analog and digital signal values shall be passed from one system to another via hardwired connections.

b. There will be one separate physical point on each system for each point to be integrated between the systems.

2. Direct Protocol (Integrator Panel)

a. The BAS system shall include appropriate hardware equipment and software to allow bi-directional data communications between the BAS system and 3rd party manufacturers' control panels. The BAS shall receive, react to, and return information from multiple building systems, including but not limited to the chillers, boilers, variable frequency drives, power monitoring system, and medical gas.

b. All data required by the application shall be mapped into the BAS system, and shall be transparent to the operator.

c. Point inputs and outputs from the controllers shall have real-time interoperability with BAS software features such as: Control Software, Energy Management, Custom Process Programming, Alarm Management, Historical Data and Trend Analysis, Totalization, and Local Area Network Communications.

2.3 USER INTERFACE

A. Browser Based Interface

1. The system shall be capable of supporting an unlimited number of clients using standard Web browser such as Internet Explorer$_{TM}$ or Netscape Navigator$_{TM}$. Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacture-specific browsers shall not be acceptable.

2. The Web browser software shall run on any operating system and system configuration that is supported by the Web browser. Systems that require specific machine requirements in terms of processor speed, memory, etc., in order to allow the Web browser to function with the Building Automation System (BAS), shall not be acceptable.

3. The Web browser client shall support at a minimum, the following functions:

a. User log-on identification and password shall be required. If an unauthorized user attempts access, notice of access failure shall be displayed. Security using authentication and encryption techniques to prevent unauthorized access shall be implemented.

b. HTML programming shall not be required to display system graphics or data on a Web page. HTML editing of the Web page shall be allowed if the user desires a specific look or format.

c. Storage of the graphical screens shall be in the Network Area Controller (NAC), without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.

d. Real-time values displayed on a Web page shall update automatically without requiring a manual “refresh” of the Web page.

e. Users shall have administrator-defined access privileges. Depending on the access privileges assigned, the user shall be able to perform the following:

1. Modify common application objects, such as schedules and setpoints in a graphical manner.
2. Commands binary objects to start and stop.
3. View logs and charts.
4. View alarms.

f. Graphic screens on the Web Browser client shall support hypertext links to other locations on the Internet or on Intranet sites, by specifying the Uniform Resource Locator (URL) for the desired link.

4. Alarms

a. Alarm feature shall allow user configuration of criteria to create, route, and manage alarms and events. It shall be possible for specific alarms from specific points to be routed to specific alarm recipients. The alarm management portion of the user interface shall, at the minimum, provide the following functions:

1. Allow configuration to generate alarms on any numeric, binary, or data point in the system.
2. Generate alarm records that contain a minimum of a timestamp, original state, acknowledged state, alarm class and priority.
3. Allow the establishment of alarm classes that provide the routing of alarms with similar characteristics to common recipients.
4. Allow a user, with the appropriate security level, to manage alarms - including sorting, acknowledging, and tagging alarms.

5. Reports and Summaries

a. Reports and Summaries shall be generated and directed to the user interface displays, with subsequent assignment to printers, or disk. As a minimum, the system shall provide the following reports:

1. All points in the BAS
2. All points in each BAS application
3. All points in a specific controller
4. All points in a user-defined group of points
5. All points currently in alarm
6. All BAS schedules
7. All user defined and adjustable variables, schedules, interlocks and the like.

b. Reports shall be exportable to .pdf, .txt, or .csv formats.

c. The system shall allow for the creation of custom reports and queries.

6. Schedules

    a. A graphical display for time-of-day scheduling and override scheduling of building operations shall be provided. At a minimum, the following functions shall be provided:

        1. Regular schedules

        2. Repeating schedules

        3. Exception schedules

    b. Weekly schedules shall be provided for each group of equipment with a specific time use schedule.

    c. It shall be possible to define one or more exception schedules for each schedule including references to calendars.

    d. Monthly calendars shall be provided that allow for simplified scheduling of holidays and special days. Holidays and special days shall be user-selected with the pointing device or keyboard.

7. Password

    a. Multiple-level password access protection shall be provided to allow the user/manager to user interface control, display, and database manipulation capabilities deemed appropriate for each user, Based on an assigned password.

    b. Each user shall have the following: a user name, a password, and access levels.

    c. The system shall provide the capability to require a password of minimum length and require a combination of characters and numerical or special characters.

    d. When entering or editing passwords, the system shall not echo the actual characters for display on the monitor.

    e. The system shall provide unlimited flexibility with access rights. A minimum of four levels of access shall be provided along with the ability to customize the system to provide additional levels.

    f. A minimum of 100 unique passwords shall be supported.

    g. Operators shall be able to perform only those commands available for their respective passwords. Display of menu selections shall be limited to only those items defined for the access level of the password used to log-on.

    h. The system shall automatically generate a report of log-on/log-off and system activity for each user.

    i. All log data shall be available in .pdf, .txt, and .csv formats.

8. Dynamic Color Graphics

    a. The graphics application program shall be supplied as an integral part of the User Interface. Graphics shall be DGLux 2.0.

    b. The graphics applications shall include a create/edit function and a runtime function. The system architecture shall support an unlimited number of graphics documents (graphic definition files) to be generated and executed.

    c. The graphics shall be able to display real-time data that is acquired, derived, or entered.

    d. Graphics runtime functions –Each graphic application shall be capable of the following functions:

1. All graphics shall be fully scalable.
2. The graphics shall support a maintained aspect ratio.
3. Multiple fonts shall be supported.
4. Unique background shall be assignable on a per graphic basis.

e. Operation from graphics – It shall be possible to change values (setpoints) and states in systems controlled equipment within the Web browser interface.

f. Graphic editing tool – A graphic editing tool shall be provided that allows for the creation and editing of graphic files. The graphic editor shall be capable of performing/defining all runtime binding.

9. Historical Data Collection

a. All numeric, binary or data points in the system database shall allow their values to be logged over time (trend log). Each historical record shall include the point's name, a time stamp including time zone, and the point's value.

b. The Network Area Controller (NAC) shall have the ability to store its historical data records locally and periodically to a remote server on the network (archiving).

c. The configuration of the historical data collection shall allow for recording data based on change of value or on a user-defined time interval.

d. The configuration of the historical data collection shall allow for the collection process to stop or rollover when capacity has been reached.

e. A historical data viewing utility shall be provided with access to all history records. This utility shall allow historical data to be viewed in a table or chart format.

f. The history data table view shall allow the user to hide/show columns and to filter data based on time and date. The history data table shall allow exporting to .txt, .csv, or .pdf file formats.

g. The historical data chart view shall allow different point histories to be displayed simultaneously, and also provide panning and zooming capabilities.

10. Audit Log

a. For each log entry, provide the following data:

1. Time and date.
2. User ID
3. Change or activity: i.e., Change setpoint, add or delete objects, commands, etc.

11. Database Backup and Storage

a. The user shall have the ability to backup the System Controller databases.

12. Graphical User Interface Panel

1. On Site GUI - All owner sites shall be able to connect using the native Wi-Fi system built into the WEBS-N4.
2. Micro-SD card backup/restore/upgrades
3. Touch alarm console
4. Touch platform management
5. kitTouch – specialized widgets for touch applications

6. Licensed for Niagara Network, Modbus TCP Slave, BACnet MSTP/IP and Lon.

7. GUI shall be incorporated in the NAC (SCP) Enclosure.

2.4 AUTOMATION NETWORK

A. Network Server

1. A central server, located where the owner directs, shall be provided when multiple Supervisory Controllers are used. The server shall support all Network Area Controllers (NAC) connected to the customer's network whether local or remote.

2. Contractor shall have responsibility of bringing the firmware to current N4 version. Any sites that require this to match shall also be included in this contract.

3. Server Hardware Requirements: The server hardware platform shall have the following requirements:

a. Central Server: A dedicated server for BAS system with configuration that includes the following components as a minimum.

b. Processor: Xeon CPU E5-2640 (or better) compatible with dual and quad-core processors.

c. Memory: 8 GB for Windows 64 bit versions. Hard drive 6 GB.

d. Display: Video card and monitor capable of displaying 1024 x 768 pixel resolution or greater. Monitor shall be 28" or greater.

e. Connection to the FMCS network shall be via an Ethernet network interface card, 10/100 Mbps.

4. Local connections shall be via an Ethernet LAN. Remote connections can be via ISDN, ADSL, T1.

5. It shall be possible to provide access to all Network Area Controllers via a single connection to the server. In this configuration, each Network Area Controller can be accessed from the Graphical User Interface (GUI) or from a standard Web browser (WBI) by connecting to the server.

6. The server shall provide the following functions, at a minimum:

a. Global Data Access: The server shall provide complete access to distributed data defined anywhere in the system.

b. Distributed Control: The server shall provide the ability to execute global control strategies based on control and data objects in any NAC in the network, local or remote.

c. The server shall include a master clock service for its subsystems and provide time synchronization for all Network Area Controllers (NAC).

d. The server shall accept time synchronization messages from trusted precision Atomic Clock Internet sites and update its master clock based on this data.

e. The server shall provide scheduling for all Network Area Controllers and their underlying field control devices.

f. The server shall provide demand limiting that operates across all Network Area Controllers. The server must be capable of multiple demand programs for sites with multiple meters and or multiple sources of energy. Each demand program shall be capable of supporting separate demand shed lists for effective demand control.

g. The server shall implement the BACnet Command Prioritization scheme (16 levels) for safe and effective contention resolution of all commands issued to

Network Area Controllers. Systems not employing this prioritization shall not be accepted.

h. Each Network Area Controller supported by the server shall have the ability to archive its log data, alarm data and database to the server, automatically. Archiving options shall be user-defined including archive time and archive frequency.

i. The server shall provide central alarm management for all Network Area Controllers supported by the server. Alarm management shall include:

1. Routing of alarms to display, printer, email and email compatible pagers
2. View and acknowledge of alarms
3. Query alarm logs based on user-defined parameters

j. The server shall provide central management of log data for all Network Area Controllers supported by the server. Log data shall include process logs, runtime and event counter logs, audit logs and error logs.

B. Network Area Controller (NAC)

1. The NAC must provide the following hardware features as a minimum:

a. Communications

1. Two 10/100 Mbps Ethernet Port – RJ-45 connection
2. Two Isolated RS-485 ports with biasing switches (up to 57,600 baud) shall be standard. Gateways or non-Honeywell drivers not allowed.
3. 1 GB RAM and 4 GB Flash Total Storage / 2 GB User Storage
4. All required protocol drivers are included. Lon. BACnet, Modbus shall be resident as standard without additional costs, additional hardware External gateways shall not be acceptable.
5. NAC shall have built in Wi-Fi network. If WEBS-8000 is mounted inside of a steel enclosure, the antenna for the Wi-Fi shall be mounted externally.
6. Removable micro-SD card with 4GB flash total storage/2GB user storage.

b. Inputs/Outputs

1. Four form C SPDT relay outputs rated for 24 VAC/DC @ 2Amps resistive each with individual LED indicators
2. Six Universal Inputs for 10K NYC, 4-20 mA, 1-10 V, Dry contact
3. Additional Remote I/O modules (4 max) shall be allowed if needed

c. Environment

1. Must be capable of operation over a temperature range of -20ºC to 60ºC.

d. Performance

1. WEBS-8000 shall be licensed for total number of controllers in this project plus an additional 10 as minimum.
2. WEBS-8000 shall be licensed for a 5 year SMA (Software Maintenance Agreement).

2. The Network Area Controller (NAC) shall be a fully user-programmable device capable of providing all of the capability described in Section 2.3 Part A.

3. Automation network – The Network Area Controller (NAC) shall reside on the automation network. Each NAC shall support one or more sub-networks of controllers.

4. User Interface – Each Network Area Controller (NAC) shall have the ability to deliver a web based user interface as previously described. All computers connected physically or virtually to the automation network shall have access to the web based UI.

5. Power Failure – In the event of the loss of normal power, The Network Area Controller (NAC) shall continue to operate for a define period after which there shall be an orderly shutdown of all programs to prevent the loss of database or operating system software. Flash memory shall be incorporated for all critical controller configuration data.

   a. During a loss of normal power, the control sequences shall go to the normal system shutdown conditions.

   b. Upon restoration of normal power and after a minimum off-time delay, the controller shall automatically resume full operation without manual intervention through a normal soft-start sequence.

   c. Certification – All controllers shall be listed by Underwriters Laboratories (UL).

C. Application Specific Controllers (ACS's)

1. The ASC devices must provide the following hardware features as a minimum:

   a. Communications:

      1. Spyder/Stryker controllers by Honeywell Controls shall be installed.

   b. Inputs/Outputs

      1. Six form C SPDT relay outputs rated for 24 VAC/DC @ 2Amps resistive.

      2. Six Universal Inputs for 1K,, 4-20 mA, or 0-10 V, Dry contact

      3. Three analog outputs with 0-10vdc.

   c. Environment

      1. Must be capable of operation over a temperature range of 0ºC to 55ºC.

      2. Must be capable of withstanding storage temperatures of between 0ºC and 70ºC.

      3. Must be capable of operation over a humidity range of 5% to 95% RH, non-condensing.

2.5 SOFTWARE PROGRAMMING/TOOLS

A. Network Area Controller Toolset

1. Device embedded toolset shall provide the following capabilities in a graphical environment using a standard Web browser. One toolset shall be used for both the WEBS-8000 and the Spyder/Stryker controllers.

   a. Device and point management

   b. Scheduling, alarming and trending setup

   c. Creation and binding of graphics

   d. Time management

   e. User management

2. Toolset provides additional engineering capabilities including:

   a. Editable table based point listings.

   b. Automatically generated graphics for standard applications.

B. Device Program Editor

1. Definition of application and logic and display operation shall be available in a completely graphic environment.

2. Definition of operator device characteristics, Digital Controllers (DC) panels, individual points, applications, and control sequences shall be performed in a drag and drop programming environment.

3. All temperature and equipment control strategies, energy management routines, scheduled operations and local device status indicators shall be definable by the operator. User password access and language options shall be definable by the operator.

4. Event definition, prioritization, logging and reporting options are definable by the operator.

5. Application logic shall provide for stand-alone applications as well as distributed applications that are automatically downloaded from master controllers to a network of controllers.

6. The programming environment shall provide help menus and instructions for each operation and/or application performed, for all programming library functions, and for the programming language itself.

7. Libraries of standard application modules shall be provided, such as temperature, humidity, and flow control. These modules may be used as “building blocks” in defining or creating new control sequences. In addition, the user shall have the capability to easily create and archive new modules and control sequences.

2.6 LOCAL CONTROL PANELS

A. All control panels shall be factory constructed, incorporating the BAS manufacturer’s standard designs and layouts. All control components shall be UL inspected and listed. Control panels shall be fully enclosed, with sub-panel, hinged door, and slotted flush latch. Control panels shall exist on all equipment specified and shall be UL listed as a complete fabricated system. UL listings shall be shown on final drawings.

B. In general, the control panels shall consist of the DDC controller(s), display module as specified and indicated on the plans, and I/O devices—such as relays, transducers, and so forth—that are not required to be located external to the control panel due to function. Where specified the display module shall be flush mounted in the panel face unless otherwise noted.

C. All I/O connections on the DDC controller shall be provide via removable or fixed screw terminals.

D. Low and line voltage wiring shall be segregated. All provided terminal strips and wiring shall be UL listed, 300-volt service and provide adequate clearance for field wiring.

E. All wiring shall be neatly installed in plastic trays or tie-wrapped.

F. A convenience 120 VAC duplex receptacle shall be provided in each enclosure, fused on/off power switch, and required transformers.

PART 3 - EXECUTION

3.1 PREPARATIONS:

A. Prior to Installation: Inspect the installed work executed under other Sections which affect the installation of the controls. Report unacceptable conditions to Engineer. Do not begin work until unacceptable conditions have been corrected. Installation of the controls shall constitute acceptance of existing conditions.

B. Coordination: Coordinate work with work specified under other Sections to ensure proper and adequate interface of work. Equipment and systems drawings are generally diagrammatic unless dimensions are indicated. Drawings and details shall be checked for interference's with structural and other conditions prior to performing work.

C. The Contractor shall be responsible for safety and good condition of his materials and equipment until final acceptance by the Owner. He shall erect and maintain suitable barriers, protective devices, lights and warning signs where required.

3.2 INSTALLATION:

A. General:

1. When applicable installation procedures are shown or specified in other sections, those procedures shall be followed.

2. Provide all supports and hangers, etc., as required to install the equipment as specified or shown on the drawings. All equipment shall be supported, braced and cross-braced to comply with current CBC and CMC.

3. Sealing: Wherever any part of the control system has to pierce the roofing, openings through the roof shall be flashed absolutely watertight.

4. Arrange and support piping and equipment so that vibration is at a minimum and is not transmitted to or through building structure.

3.3 WIRING AND CONDUIT:

A. Control wiring and conduit shall be the responsibility of this section and be installed as follows:

1. In equipment rooms/attics – Conductors shall be run in conduit. Final connection to equipment shall be flexible conduit.

2. Concealed in building construction (wall/inaccessible ceilings) - Conductors shall be run in conduit.

3. Roof mounted/exterior equipment yards - Conductors shall be in conduit. All flexible conduit shall be seal-tite with weatherproof connections. Equipment on grade and detached from the building a distance greater than 36" shall have underground control conduit routed to equipment.

4. Above accessible ceiling spaces - Control cable will be allowed to be installed without conduit in accessible areas above ceilings as follows:

a. Cable is an approved type for the application.

b. Cable is bundled/organized in management devices routed square with building lines (no diagonals) and kept clear of electrical devices (i.e., ballasts, transformers, etc.) that could cause interference.

c. Conduit sleeves are provided between accessible ceiling spaces (i.e., across soffits, gypboard ceilings, etc.) as required to maintain future access to cable.

5. Cable routed in accessible ceiling spaces shall comply with EIA/TIA standards for communications cabling. Communication bus wire shall be W223C-2144FCBC Connect Air, blue jacketed shielded cable.

3.4 CONTROL PANELS AND DEVICE LOCATIONS:

A. All controllers, relays, switches, etc., for equipment located within equipment rooms shall be mounted in enclosed UL listed control panels with hinged locking doors. All control devices equipment located in exposed areas subject to outside weather conditions shall be mounted inside weatherproof enclosures.

B. Location of each panel is to be convenient for adjustment and service. Submit locations of all panels to the engineer with shop drawings.

3.5 IDENTIFICATION:

A. The label wording shall match that used on the drawings and provide clearly readable printed labels for each control component inside a panel. When applicable, additional identification needed shall be documented on the Shop Drawings. See Specification Section 15100.

B. Engraved nameplates shall be provided on the face of each panel and beneath each actuator and control device not in a panel describing its use.

C. All electrical devices within the panel shall be wired to a terminal strip within the panel. An "electric terminal" numbering system shall be applied to all terminals with aforementioned numbers matching terminals shown on Shop Drawings.

3.6 CLOSING-IN OF UNINSPECTED WORK:

A. General: Do not allow or cause any of the Work of this Section to be covered up or enclosed until it has been inspected, tested, and approved by the Mechanical Engineer and by all other authorities having jurisdiction.

B. Uncovering: Should any of the Work of this Section be covered up or enclosed before it has been completely inspected, tested, or approved, do all things necessary to uncover all such work. After the Work has been completely inspected, tested, and approved, provide all materials and labor necessary and make all repairs necessary to restore the Work to its original and proper condition at no additional cost to the Owner.

3.7 PROGRAMMING:

A. The Direct Digital Control (DDC) operational program will be provided by the TC-PRO Contractor. The Contractor shall provide any testing program they feel necessary to fully test the operation of the various components. Programming shall be verified for proper operation by Total Control.

3.8 SYSTEM INSTRUCTION AND RECORD DRAWINGS

A. The Control Contractor shall schedule a minimum of 24 hours of training to train the owner's representative in the use and care of the system. This training shall occur after all commissioning of the control system is completed.

B. Instruction period shall be started after instuction books, service manuals and record drawings have been submitted to and approved by the Architect and shall be at hours (regular and non-regular) arranged by the Architect.

C. Service manuals shall include oiling, cleaningm and servicing data, compiled in clearly and easily understood form and in a burable binder. Data shall show all serial numbers of every piece of equipment and complete list of replacement parts.

3.9 COMMISSIONING THE SYSTEM:

A. The commissioning period starts when the following conditions are met:

1. The DDC system and all involved HVAC equipment have been installed, connected to the DDC system and ready to operate.

2. A commissioning meeting has been conducted with representative of contractor's involved building occupants, Project Commissioning Agent, General Contractor, Mechanical Contractor, Total Control, and the TC-PRO System Contractor.

3. Consensus is reached, by the representatives at the above referenced meeting, that it is appropriate for the commissioning process to start. The operational program is loaded into the DDC system by the TC-PRO Contractor.

B. During the commissioning period, the TC-PRO Contractor will maintain a commissioning file of the printed reports from the building.

C. During the commissioning period all mechanical equipment with filters shall have new filters installed. The static pressure across the fan shall be accurately measured and documented if installed.

D. The commissioning process will be completed and the warranty period shall start when the following conditions are met.

1. All training to be provided as part of the project has been completed.
2. No "alarm" or "condition reports" are being generated by the DDC system for seven (7) calendar days (168 hours) due to incomplete or inaccurate installation, program, or programming.
3. All adjustments and "fine tuning" of the system have been completed.
4. The system has been accepted by the General Contractor and Building Owners and approved by the Mechanical Engineer.

END OF SECTION

SECTION 26 00 00
ELECTRICAL

1.00 – GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

Work in general includes, but is not limited to, the following:

A. Underground Service - 120/208 volt, three phase, four wire.

B. Grounding of equipment, service, etc.

C. Complete lighting and power system as shown on Drawings and specified herein, including conduit, wiring, panelboards, circuit breakers, relays, switches, receptacles, and other items necessary for complete and operable systems.

D. Electrical connection of equipment furnished by others as shown on the Drawings.

E. Control wiring and installation and connections of control devices as specified herein.

F. Telephone and Cable TV service.

G. Trenching and backfill as required for electrical Work.

H. Concrete Work as specified herein.

1.03 SITE VISITS, COORDINATION OF CONTRACT DOCUMENTS, VERIFICATION OF DIMENSIONS:

A. Examine existing conditions as applicable. Become acquainted with Specifications and Drawings for all portions of the Project. Notify Project Manager of apparent discrepancies and of inconsistency between the Specifications and the existing conditions. Secure and follow Project Manager's instructions. The Drawings serve as working drawings only, indicating diagrammatically the general layout of the systems and their various components and equipment.

B. Scaled and figured dimensions are approximate and are given for estimate purposes only. Carefully check and verify dimensions and sizes in order to determine if equipment and materials will fit together and if the dimensions of the assembly are compatible with the space provided. Where equipment is furnished by others, verify that dimensions and requirements for assembly are compatible with the space provided before proceeding with the roughing-in connections. Field verifications of locations shown on Drawings are necessary since actual locations, distances, mounting heights, etc., may be affected by field conditions. The right is reserved to make reasonable changes in locations of equipment or other features shown on Drawings prior to rough-in without additional cost to the Owner.

C. Where apparatus and equipment have been indicated on the Drawings, dimensions have been taken from typical equipment of the class indicated. Carefully check the Drawings to see that the contemplated equipment will fit into the spaces provided, regardless of whether or not it may have been approved for quality and utility as an equal.

D. Rough in all equipment, fixtures, etc., as designated on the Drawings and as specified herein. The Drawings indicate only the approximate location of rough-ins. The exact rough-in locations must be determined from large-scale certified Drawings. The Contractor shall obtain all certified rough-in information before progressing with any Work for rough-in connections.

E. Be responsible for providing outlets and services of proper size at the required locations.

F. Coordinate requirements of equipment furnished by others, prior to ordering and installation.

G. No allowance will be made for extra expense due to failure or neglect to follow foregoing directives.

1.04 RULES AND REGULATIONS:

A. Materials and installation shall be in accordance with current rules and requirements of California Code of Regulations and local codes and ordinances including, but not necessarily limited to, the current editions of the following:

1. The California Electrical Code (CEC).

2. Title 8, Chapter 4, California Code of Regulations (Low Voltage Electrical Safety Orders).

3. Local Building Codes.

4. California State Fire Marshal.

5. California Statewide Qualified Product List (QPL), Title 20.

6. Design Lights Consortium (DLC).

7. NEMA (National Electrical Manufacturers Assoc.).

8. IEEE (Institute of Electrical and Electronic Engineers).

9. California Green Building Code.

10. ANSI (American National Standards Institute).

11. ASTM (American Society for Testing and Materials).

12. UL (Underwriters Laboratories).

13. OSHA (Occupational Safety & Health Act) Federal.

14. Title 24, California Code of Regulations, California Building Code.

15. NFPA (National Fire Protection Association).

16. NESC (National Electrical Safety Code).

17. NECA Standards of Installation.
    a. NECA 400-2018, Standard for Installing and Maintaining Switchboards (ANSI).
    b. NECA 402-2018, Standard for Installing and Maintaining Motor Control Centers (ANSI).

c. NECA 408-2002, Recommended Practice for Installing and Maintaining Busways (ANSI).
d. NECA 409-2018, Recommended Practice for Installing and Maintaining Dry-Type Transformers (ANSI).
e. NECA 410-2005 Standard for Installing and Maintaining Liquid-Filled Transformers (ANSI).
f. NECA 411-2006 Standard for Installing and Maintaining Uninterruptible Power Supplies (UPS) (ANSI).
g. NECA 420-2018 Standard for Fuse Applications (ANSI).
h. NECA 430-2006, Standard for Installing Medium-Voltage Metal-Clad Switchgear (ANSI).
i. NECA/EGSA 404-2007 Standard for Installing Generator Sets (ANSI).
j. NECA/IESNA 500-2006, Standard for Installing Indoor Lighting Systems.
k. NECA/IESNA 501-2006 Standard for Installing Exterior Lighting Systems.
l. NECA 331-2018, Standard for Building and Service Entrance Grounding and Bonding

B. Where these Specifications call for a higher standard than the above-mentioned rules, the Specifications shall govern.

C. Should there be any direct conflict between the above-mentioned rules and these Specifications, the rules shall govern.

D. Nothing in the Drawings or Specifications is to be construed to permit Work not conforming to the rules, codes, and regulations.

E. All materials utilized shall be new and the best of their respective grades or kinds.

1.05 DEFINITIONS:

A. Article 100 of the California Electrical Code shall serve as a guide for definitions.

B. Industry standard definitions.

C. Specific Definitions:

1. Concealed: Hidden from sight, as in trenches, chases, hollow construction, above furred spaces, suspended ceilings (acoustical or plastic type), or exposed to view only in tunnels, attics, shafts, crawl spaces, unfinished spaces, or other areas solely for maintenance and repair.

2. Exposed: Not concealed.

3. Unfinished Space: A room or space that is ordinarily accessible only to building maintenance personnel, a room noted on the "Finish Schedule" with exposed and unpainted construction for walls, floor or ceilings, or specifically mentioned as "unfinished".

4. Finished Spaces: Any space ordinarily visible to the visiting public, including exterior areas.

1.06 RULES OF LOCAL UTILITY COMPANIES:

A. Comply with rules and regulations of the serving utility companies, and before submitting bid, check and include applicable service costs for the Project.

1.07 RECOGNIZED TEST LAB:

A. All equipment specified or installed under this project shall be listed by a recognized test lab and bear that label of approval.

1.08 PERMITS AND FEES:

A. Procure licenses and permits necessary for the completion of the Work, and inspection and other applicable fees. Before final payment, deliver to the Owner certificates and permits, approved and signed by the authorities having jurisdiction.

1.09 RECORD DRAWINGS:

A. Include under this Work complete and accurate record information both during construction and before final acceptance by the Owner, and costs associated therewith shall be included under this Work.

B. Obtain from the Project Manager, at cost, a complete, full size set of prints. On these prints, systematically and accurately keep an up-to-date and legible dimensional record of Work installed differently from the location or manner indicated by the Drawings, as well as exact locations of stub-outs and hidden or underground features. Have these Drawings readily available for reference and review. When job status permits, submit them to the Project Manager and amend or correct and re-submit if requested.

C. When the above information is complete and acceptable, deliver Record Drawings to the Project Manager.

1.10 SUBMITTALS – SUBSTITUTIONS:

A. Bids shall be based on Drawings and Specifications and references exactly as shown except as substitutions are permitted under terms of the Instructions to Bidders. Acceptance by the Project Manager of a variation or alternate shall not of itself waive other requirements of the Drawings and Specifications.

B. Before a substitute is used, it shall be equal in quality and utility to the material or make of equipment specified, and furthermore, shall be suitable for the particular application. The decision of the Project Manager as to the quality and utility of the substitute offered shall be final.

C. When submitting a substitute to a specified item, provide complete data for both the specified item and the substitute. Complete data includes:

1. Catalog cuts with complete dimensions, characteristics, electrical properties, Underwriter's Laboratory listing, harmonics, light output, mounting and support requirements.

2. Calculations, photometrics, system load data, energy effect on system, etc.

If the substitute is not deemed equal in both utility and quality to the specified item, the specified item will be approved and it shall be provided by the Contractor.

D. Submit in one package complete systematized lists of equipment and Drawings, catalog cuts, brochures, capacity tables and curves, descriptive information, performance data and guarantees and warranties referenced either to applicable Specification paragraphs or to item numbers as shown on the Drawings, or both. Submit six (6) copies.

E. Do not order or install equipment until submittals have been reviewed and approved.

F. Where accepted materials or equipment other than is specified or shown on the Drawings require redesign of structural, architectural, electrical or mechanical features or layouts, such changes shall be made by, or at the expense of the Contractor - all subject to complete review by the Project Manager.

G. Because of the contingencies involved, review and general acceptance of proposed substitutes shall not relieve the Contractor's responsibility under this Work for ensuring in all respects the suitability of such materials and equipment for the particular Project requirements.

1.11 SHOP DRAWINGS:

A. Prepare shop Drawings of items as required by the Project Manager or by Drawings and Specifications; submit six (6) copies of each to the Project Manager as part of the submittal package, sufficiently in advance of construction, if necessary.

B. The shop drawings shall be submitted sufficiently in advance of construction to allow time for review and for resubmission, if necessary.

C. Submit all shop drawings and data at one time for equipment provided under this Section. The complete electrical shop drawings shall be bound in one pamphlet or binder indexed to this Section.

D. Shop drawing submittals processed are not change orders. The purpose of shop drawing submittals by the Contractor is to demonstrate that the Contractor understands the design concept; 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. If deviations, discrepancies or conflicts between shop Drawings and Specifications are discovered, either prior to or after shop drawing submittals are processed, the design Drawings and Specifications shall control and shall be followed.

E. Manufacturers' data and dimension sheets shall be submitted giving all pertinent physical and engineering data including weights, cross-sections and maintenance instructions. Standard items of equipment such as receptacles, switches, plates, etc., which are cataloged items, shall be listed by manufacturer.

F. Index all submittals and reference to these Specifications.

1.12 COMPLETION DATA:

A. Submit completion data to the Project Manager in acceptable quantity and form before requesting a final inspection. Such submittal shall be corrected, amended, or completed before final acceptance of the Work.

B. Include Record Drawings, maintenance manuals, and data; test results; control and wiring diagrams.

1.13 CUTTING, PATCHING, AND REPAIRING:

A. Cutting, patching, and framing of wood members to accommodate this Work shall be done by the Contractor and shall be in conformance with Sections 613 and 617 (F) and (K), Title 24, California Code of Regulations. All such cutting, patching and framing shall be approved by the Project Manager.

B. Do minor miscellaneous cutting, drilling, and patching necessary and normally required at the time of actually installing this Work. Patching shall be of the same materials, workmanship, and finish as the original or surrounding Work to the complete satisfaction of the Project Manager. Comply with Division-1 CUTTING AND PATCHING Section.

C. Adequately inform other trades of openings and framing requirements for this Work and provide suitable instructions for establishing locations and sizes of openings or sleeves so that these may be provided in the proper location at the proper time. Concrete shall not be cut, except where approved by the Project Manager.

1.14 SIMILARITY OF MATERIALS:

A. Unless specified otherwise, fixtures, fittings, hangers, and respective type features and equipment, of a similar type or having similar operative or functional features, shall be of the same manufacturer throughout the Project.

1.15 MANUFACTURERS' DIRECTIONS:

A. Follow manufacturers' directions and recommendations in all cases where the manufacturers' equipment or articles are used for this Work. Compliance with the manufacturer's direction is a requirement for that product's listing with a recognized test lab.

1.16 VERIFICATION OF DIMENSIONS:

A. Scaled and figured dimensions are approximate only. Before proceeding with Work, carefully check and verify dimensions, etc., on architectural Drawings, and be responsible for properly fitting equipment and materials together and to the structure in spaces provided.

B. Drawings are essentially diagrammatic, and many offsets, bends, pull boxes, special fittings, and exact locations are not indicated. Carefully study Drawings and premises in order to determine best methods, exact locations, routes, building obstructions, etc., and install apparatus and equipment in available locations. Install apparatus and equipment in manner and locations to avoid obstructions, preserve headroom, and keep openings and passageways clear.

1.17 IDENTIFICATION OF EQUIPMENT:

A. All electrical equipment shall be labeled, tagged, stamped, or otherwise identified in accordance with the following schedule:

1. Branch Circuit Panelboards:

a. Panel identification shall be P-Touch ¾” label.

b. Circuit directory shall be a two-column, 8-1/2 x 11” sheet attached to the inside of the door. Each odd numbered circuit shall be in sequence in the left column and the even numbered circuit in the right column (e.g., 1, 3, 5..., 2, 4, 6...). Each circuit shall be identified as to the use and room name(s) or area(s). Confirm room names and/or room numbers with the Project Manager prior to project completion. Circuit breaker identification shall be by permanently installed metal numbers or plastic numbers under acrylic plastic. "Paste-on" numbers will not be accepted. Refer to "Panelboards" section for additional requirements.

2. Distribution Panelboards: Identification shall be with 1" x 4" laminated, white on black, micarta nameplates on each major component, each with name and/or number of unit

and other pertinent data as required. Emergency power distribution panels shall be identified with white on red micarta nameplates. Letters shall be no less than 3/8" high.

3. Circuit breakers shall be identified by number and name with 3/4" x 1-1/2" laminated micarta nameplates with 3/16" high letters mounted adjacent to circuit breaker or switch.

4. Miscellaneous equipment (electrical), such as individually mounted safety switches, starters, step-down transformers, pull boxes, junction boxes, etc., shall be identified by the use of such equipment with P-Touch labels as required.

5. In general, the installed nameplates, as herein called for shall also clearly indicate its use, area served, circuit identification, voltage and any other useful data.

6. All auxiliary systems, including communications, shall be labeled to indicate function.

7. Motor control and motor control centers shall be labeled with the identification given on drawing schedules.

1.18 ARC FLASH LABELING:

A. All panels, circuit breaker enclosures, switchboards and motor control centers shall be labeled with Arc Flash Warning Stickers.

B. These labels shall contain the following:

1. Arc Flash Boundary
2. Minimum arc rating
3. Personal Protective Equipment Level, PPE
4. Shock Hazard Level
5. Available Fault Current
6. Date

1.19 CLOSING IN OF UNREVIEWED WORK:

A. Do not allow or cause any of this Work to be covered up or enclosed until it has been reviewed by the Project Manager. Should any of this Work be enclosed or covered up before such review, uncover the Work and make repairs with such materials as may be necessary to restore the Work and that of the other trades to its original and proper condition at no additional cost to the Owner.

1.20 SAFETY PRECAUTIONS:

A. It is intended that within the scope of this Work during construction and until final acceptance, strict attention be given to matters pertaining to public safety and to safety of the construction workers and complementing personnel; and to other health and building safety requirements as specified and indicated including, but not limited to: Protection of openings in fire-rated construction; clearances from and/or protection of combustibles; proper securement for fixtures, equipment materials; method of performing the Work, operational and safety check of electrical devices, etc.; erection and maintenance of suitable barriers, protective devices, lights and warning signs and adequate provisions for storage and protection of Work, materials and equipment.

B. It is understood that the responsibility for the proper attention to the above stipulations is included under this Work.

1.21 WIRING OF EQUIPMENT FURNISHED UNDER OTHER SECTIONS

A. All electrical wiring including power wiring and control wiring (except as specified under Automatic Temperature Control), including raceways, wiring, outlet and junction boxes, and labor for installation of the wiring and equipment shall be included in this section of the Specifications.

B. All control devices, and starters not in motor control centers, for equipment furnished under the Air Conditioning section (except as specified under Automatic Temperature Control paragraph), Plumbing section, Fire Sprinkler or Lawn Sprinkler section are to be furnished under that particular section and installed under this section.

C. Wiring diagrams complete with all connection details shall be furnished under each respective section.

D. Coordinate requirements and locations for all equipment prior to ordering and installation.

E. Comply with requirements of Article 430 of the California Electrical Code.

1.22 EXCAVATION AND BACKFILL

A. Do excavation, trenching, and backfilling required for this Work. Do shoring, pumping, or draining that is necessary to keep the excavations and trenches safe and free from water. Where possible and practical, avoid planted or paved areas, walkways, floors, and other finished surfaces. See CONDUITS Sections for depth of conduits. Remove all excess excavated materials from the site, unless otherwise directed by the Project Manager.

B. Where required, do cutting and drilling of walls, pavements, walkways, etc., by means of cutting and drilling (coring) machines unless specifically approved otherwise.

Excavation, trenching, and backfill methods and procedures shall be in strict accordance with industry standards and local requirements.

C. Backfilling shall be done in one-foot layers, with each layer tamped before another layer is added. No stones or coarse lumps shall be laid directly on conduits.

1.23 BORING/HORIZONTAL DRILLING

A. Where approved as an alternate to trenching, provide boring plans. These plans shall be reviewed and approved before any boring operations may commence.

B. Boring plans shall include:

1. Bore pit location(s).
2. Receiving pit location(s).
3. Method of boring.
4. Procedure for protecting/avoiding existing lines.
5. Procedure for emergency repair of any damaged lines.

C. Obtain as-built plans of all site utilities before boring.

D. Call USA Dig or use a locator service to identify underground utilities before boring.

1.24 CONCRETE

A. Where used for structures to be provided under the contract such as bases, etc., concrete work and associated reinforcing shall be as specified under that Division.

B. See other sections for additional requirements for underground vaults, cable ducts, etc.

1.25 PROTECTION OF EXISTING LINES:

A. Exercise special care to avoid damaging and to maintain in operation, all existing utility runs during the construction period. Also avoid damaging existing piping, conduits, or equipment that is to remain, whether or not specifically indicated on the Drawings. Existing utilities, piping, conduits, and equipment may or may not be shown on the Drawings. The Drawings only reflect information intended to suggest the probable extent and possible location of indicated runs and equipment. There may be other runs. There may be other locations. Neither the Owner nor the Project Manager represents that either has any precise knowledge as to either the full extent or exact location of equipment and runs that may fall within the building or Project Site.

B. Execute excavation and demolition on the Site and in the building with extreme care (by hand or small tools wherever appropriate) and at the sole risk of the Contractor and the workers involved.

C. Locate all known existing installations before proceeding with construction operations which may cause damage to such installations. The existing installations shall be kept in service where possible and damage to them shall be repaired at no increases in Contract Sum.

D. If other structures or utilities are encountered, request Project Manager to provide direction on how to proceed with the Work.

1.26 MOUNTING:

A. Provide materials and accessories necessary to properly mount and secure equipment furnished and/or installed under the electrical Work. This includes but is not limited to such items as conduit, outlets, junction boxes, switches, relays, disconnect switches, lighting fixtures, cabinets, and transformers.

B. Inserts and Anchors shall be:

1. Furnished and installed for support of Work under this Division.

2. Adjustable concrete hanger inserts installed in new concrete work as manufactured by Hilti or as approved.

3. Installed in locations as approved by Project Manager.

4. Expandable lead type anchors installed in existing concrete with minimum surface damage, as manufactured by Hilti.

5. Toggle bolts, or "molly anchors", where installed in concrete block walls.

6. Complete with 3/16" or heavier steel backup plate where used to support heavy items. Through-bolts or backup plate shall be concealed from view, except as otherwise indicated.

C. Mounting of equipment that is of such size as to be freestanding and that equipment which cannot conveniently be located on walls, such as motor starters, etc., shall be rigidly supported on a framework of galvanized steel angle, Unistrut or as approved.

D. Furnish and install sleeves for the installation of Work under all sections of this Division. Sleeves through floors, roof and walls shall be as described in conduit section.

1.27 MOUNTING HEIGHTS:

A. Receptacles shall be mounted no lower than 15” to the bottom of the device.

B. Switches and lighting control stations shall be mounted no higher than 48” to the top of the device.

C. Overcurrent devices and circuit breakers or disconnect switches shall be mounted no higher than 6 feet-7 inches.

D. Refer to the Drawings for specific mounting heights.

1.28 ACCESSIBILITY:

A. Install all control devices or other specialties requiring reading, adjustment, inspection, repairs, removal or replacement conveniently and accessibly throughout the project.

B. All required access doors or panels in walls and ceilings are to be furnished and installed as part of the Work under this Division.

C. Provide doors which pierce a fire separation with the same fire rating as the separation.

D. Refer to "Finish Schedule" for types of walls and ceiling in each area and architectural Drawings for rated wall construction.

E. Coordinate Work of the various sections to locate specialties requiring accessibility with others to avoid unnecessary duplication of access doors.

1.29 FIRE-RATED PENETRATIONS:

A. All penetrations in fire-rated assemblies shall be accomplished using a UL listed method and materials.

B. Fire-rated assembly penetrations shall be accomplished per details on the Drawings.

1.30 FLASHING:

A. Flash and counterflash all conduits penetrating roofing membrane.

1.31 TESTS:

A. Perform electrical tests as required or directed. Provide materials, labor, and equipment necessary for performances of these tests, and at completion of the Work perform a complete "in-service" operation of the entire electrical and power system to show compliance with the Drawings and Specifications. Replace Work showing faults under tests without additional cost to the Owner. Test system voltage at switchboards at completion of Work and provide a written report to the Project Manager.

1.32 EQUIPMENT LISTS AND MAINTENANCE MANUALS:

A. Prior to completion of job, Contractor shall compile a complete equipment list and maintenance manual. The equipment list shall include the following items for every piece of material and equipment supplied under this section of the Specifications.

1. Name, model and manufacturer.

2. Complete parts Drawings and list.

3. Local supply for parts and replacement and telephone number.

4. All tags, inspection slips, instruction packages, etc. removed from equipment as shipped from the factory, properly identified as to the piece of equipment it was taken from.

B. Maintenance manuals shall be furnished for each applicable section of the Specifications, shall be suitably bound with hard covers, and shall include all available manufacturers' operation and maintenance instructions, together with as-built Drawings and lists hereinbefore specified and other diagrams and instructions necessary to properly operate and maintain the equipment. The equipment lists and maintenance manuals shall be submitted in duplicate to Architect for approval not less than 10 days prior to the completion of the job. The maintenance manuals shall also include the name, address and phone number of the General Contractor and all subcontractors involved in any of the Work specified herein. The maintenance manuals shall be finally provided in four copies.

1.33 CLEANING:

A. During construction on a daily basis, and upon completion of the Work, remove from the site all debris and excess materials, tools, and removed items, resulting from this Work. Clean equipment, including lighting fixtures, free of dust, dirt, grease, paint, etc.

1.34 SALVAGE:

A. Deliver salvaged equipment and material deemed salvageable by Project Manager to location designated by Project Manager. Remove other removed material and equipment from site.

1.35 GUARANTEE:

A. Leave the entire installation in complete working order, free from defects in materials, workmanship or finish. Guarantee to repair or replace parts that may develop defects due to faulty materials, equipment, or workmanship within a period of one year after the Work is accepted by the Owner. Also, guarantee to repair or replace with like materials, other existing Work in the building damaged from or during the repair of any such defective equipment, materials, or workmanship.

1.36 INSTALLERS QUALIFICATIONS:

A. Installer must have electrical certification per California Labor Code Section 3099.2.

B. All work described in the Electrical Specifications and shown on Electrical Drawings shall be performed by California State Certified Electricians.

C. All electrical foremen shall have a minimum of 500 hours of documented classroom training.

D. All electrical foremen shall have a minimum of 3,000 hours of documented on-the-job training.

E. At the time equipment submittals are made, provide copies of State Certification and training documents for electricians working on this project

2.00 - PRODUCTS AND EXECUTION

2.01 GROUNDING:

A. Grounding shall be executed in accordance with applicable codes and regulations of the State of California, California Electrical Code and local authorities having jurisdiction as well as any additional provisions specified or shown on Drawings.

B. Grounding bushings shall be used wherever conduits are grounded. Feeder conduits to panels and air conditioners shall have grounding bushings.

C. Grounding conductors should be located to permit, the shortest and most direct path to ground. Connections shall be readily accessible for inspection and connections shall not be permanently concealed in floors or walls.

D. Non-current carrying metallic parts of electrical equipment and raceways shall be securely grounded to the common system ground. In all locations, ground conductors shall be run through conduits and shall be securely bonded to the conduit at the entrance and exit. The conduit for the grounding conductors shall be continuous from the point of attachment to cabinets or equipment to the grounding electrode, and shall be securely fastened to the ground clamp fittings.

E. Ground connections to equipment shall be made with an approved type of exothermic weld or shall be bolted or clamped to equipment or conduit. Sheet metal strap types of ground clamps shall not be used. Contact surfaces shall be thoroughly cleaned and bright before connection is made so as to ensure a good metal to metal contact.

F. Where nonmetallic conduit is used, ground shall be achieved through use of a separate, green-insulated, copper, code-size, ground conductor included in the conduit.

G. Bonding of cold water piping system shall be achieved at the service entrance. A copper saddle shall be installed over the copper pipe at the location of the clamp to avoid damage to the pipe.

2.02 CONDUIT:

A. Rigid Steel Conduit:

1. Rigid steel conduit shall have zinc coated exterior, zinc or enamel interior, standard weight, zinc coated couplings, locknuts and bushings and shall bear the U.L. label. Rigid conduit shall not be installed underground.

2. Use rigid conduit only for exposed exterior conduit runs, wherever subject to physical damage, or where specifically called for on the Drawings or required by a serving utility.

3. Intermediate metallic conduit (I.M.C.) may be used in lieu of rigid steel conduit.

B. Electrical Metallic Tubing:

1. Electrical metallic tubing (E.M.T.) shall bear the U.L. label and shall be zinc coated thinwall conduit with zinc-coated couplings and connections. "Indent" type fittings shall not be used.

2. E.M.T. may be used where rigid, flexible or non-metallic conduit is not required.

3. E.M.T. shall be used for interior dry locations. EMT shall be used where no specified conduit type is called for on the Drawings.

C. Flexible Metallic Conduit:

1. Flexible metallic conduit shall be galvanized steel and bear the U.L. label. Fittings for flexible conduit shall be squeeze type. Screw-in connectors and other connectors that decrease the interior diameter of the conduit shall not be used unless specifically approved by the Project Manager.

2. Liquid-tight flexible conduit shall bear the U.L. label and be plastic jacketed moisture and oil resistant with oil and vapor tight connectors.

3. Use flexible conduit for final connection to equipment where vibration may injure direct conduit connection. It may be used for indoor dry locations, for fixture whips not to exceed 72 inches and in other locations where structural conditions will not permit the use of EMT not to exceed six feet, only if approved by the Project Manager.

4. Use liquid-tight flexible conduit in lieu of flexible conduit for wet, damp, or outdoor areas or where weatherproof flexible conduit is called for on the Drawings or by code.

D. Plastic Conduit:

1. Plastic conduit shall be rigid polyvinyl chloride (PVC) Underwriter's approval, Schedule 40. Connections and fittings shall be "outside" type assembled in accordance with the recommended methods of the manufacturer.

2. Underground PVC conduit shall be buried a minimum of 24 inches below grade. Where more than two conduits are installed adjacently underground, use factory made conduit spacers.

3. PVC conduit shall be used for underground conduit runs in lieu of wrapped rigid conduit except as noted otherwise on the Drawings or required by the serving utility.

4. Provide a code size ground conductor in each conduit.

5. Only braided polyethylene or similar pull rope shall be used.

E. Installation of Conduit:

1. Underground conduit.

a. Keep interior of conduit clean and clear. Clean underground conduits by pulling a mandrel through conduit run followed with a swab before pulling wire.

b. Reroute conduit from locations shown on the Drawings where it is necessary to clear obstructions.

c. Provide junction or pull boxes where required for pulling conductors due to excessive number of bends or length of conduit runs.

d. Bury underground conduit, except those under buildings, a minimum of 24 inches below finished grade. Conduits under roadways shall be a minimum of 36 inches below finished grade. Conduit runs ¾ inch and smaller in slabs shall be located above vapor barriers. Bury conduit runs larger than ¾ inch to a minimum depth of 12 inches below floor slabs.

e. Standard factory ells shall not be used in underground service conduits or other long underground runs. Field bends shall not be flattened or kinked and shall not materially reduce the internal diameter of the conduit. Bends in long underground runs shall be made in long sweeping bends. Do not bend at couplings. Approved conduit bending methods shall be used.

f. All conduit runs shall have a code size insulated grounding conductor.

g. Properly separate two or more conduits installed underground in a common concrete envelope with approved factory made conduit spacers.

h. Locate conduit stub-outs dimensionally from building or curb lines on Record Drawings.

i. Pull wires shall be installed in empty conduits including telephone conduits and stub-outs, No. 12 AWG, type "THWN" insulated copper wire or 1/8-inch polyethylene rope shall be used.

j. Spare underground conduits shall be sealed with duct plugs that have pull tabs. Duct tape shall not be used to seal unused conduits.

2. Exposed/Concealed Conduit:

a. Provide secure mounting facilities for conduits. Wire or plumbers tape shall not be used for hanging conduit. Strap shall be factory made of the one hole malleable iron or two-hole galvanized clamp type.

b. Provide expansion couplings wherever conduits cross expansion joints.

c. Run conduit at right angles or parallel to structural members, walls, floors and ceilings. Where several conduits are run together or suspended, they shall be hung on Unistrut trapezes with minimum 3/8-inch rod hangers.

d. Cut ends of conduit square and ream to remove burrs or sharp edges. Terminate conduits properly with bushings, locknuts, etc. Terminate one (1) inch and larger conduits with insulated bushings.

e. Render conduits projecting through the roofing watertight by proper flashings. Securely fasten a sheet metal cap and tighten bank or storm collar to the conduits. Extend flashing a minimum of six (6) inches in all directions. Coordinate and install roof flashing for conduits to the satisfaction of the Project Manager.

f. All conduit runs shall have a code size insulated grounding conductor.

g. Pull wires shall be installed in empty conduits including telephone conduits and stub-outs, No. 12 AWG, type "THWN" insulated copper wire or 1/8-inch polyethylene rope shall be used.

h. Flexible conduit connections shall comply with NEC Section 350-22.

i. Provide Dura Block or similar support for roof-mounted conduits.

2.03 OUTLET, JUNCTION AND PULL BOXES:

A. Outlet boxes and junction boxes shall be galvanized one-piece pressed steel, knockout type. The size of each box shall be determined by the number of wires or conduits or size of conduits entering the box, but shall not be less than 4" square and 1-1/2" deep unless otherwise noted. All boxes shall be UL listed.

B. Minimum box size for data and telephone outlets shall be 4" square and 2-1/8" deep.

C. Single gang boxes in concrete, for fixture outlets, shall be 4-3/8" octagonal concrete boxes, 2-1/2" deep minimum.

D. Single gang boxes in concrete, for wiring devices, shall be 3-1/2" deep, 3-3/4" long and 1-7/8" wide.

E. Single gang outlet boxes installed in concrete or masonry walls shall be a minimum of 3-1/2" deep, 4" long and 2" wide, set flush with the wall and provided with a single gang wall plate.

F. Install wood blocking for outlet boxes in a rigid, workmanlike manner using new material where wood studs are used. Provide rigid support to avoid twisting of outlet boxes where steel studs are used. Boxes shall be secured such that they are level and plumb.

G. Locknuts shall be used on both sides of conduit connections to box or panel, in addition to bushing. Where a larger size opening occurs than size of conduit, use reducing washers.

H. Exposed boxes shall be weatherproof, threaded or hub condulet with gasketed condulet cover suitable for device installed or with blank cover plate when condulet is used as a junction box. Condulet wire fill capacity shall not be exceeded.

I. Recessed weatherproof outlets or junction boxes shall be equipped with neoprene gasketed covers.

J. Large size junction or pull boxes shall be fabricated from code gauge sheet steel. Where located indoors, finish shall be gray enamel and covers shall be secured with screws. Where exposed to weather, they shall be weatherproof, NEMA 3R, and rain-tight and hot-dip galvanized after fabrication; also, they shall have weatherproof gaskets, flat covers and galvanized iron screws. Provide knockouts and/or threaded hubs as required for the conduit used. Boxes in finished areas shall be prime painted.

K. Any unused, removed knockouts shall be filled with a K.O. cover.

L. Provide bonding or grounding from metal conduit terminating in junction with concentric KO's.

M. Install boxes and rings such that finished installation is flush with finished surface.

2.04 PLATES AND DEVICE COVERS:

A. Plates for switches, receptacles, telephone and blank outlets shall be stainless steel, Hubbell 302/304 alloy or Legrand "S" line, unless otherwise noted. Plates shall be engraved per Drawings or as covered under the Article of this Specification titled “Identification of Equipment”.

2.06 FLOOR BOXES:

A. Floor boxes shall be suited for the type of flooring they are installed on.

B. Floor boxes shall be fully adjustable or adaptable/trimmable to accommodate finished floor elevation.

C. Covers for floor boxes shall be brass.

D. Acceptable manufacturers: Manufacturers shall be one of the following, but not limited to:

1. Wiremold/Legrand.
2. Hubbell.

E. Components in floor boxes shall be as specified on the Drawings.

2.07 RECEPTACLES:

A. Duplex convenience outlets shall be specification grade, backwire, three wire, NEMA #5-20R, self-grounding type, 20 ampere, 125 volt parallel slots, polarized, in white. Additional receptacles shall be as indicated on the Drawings. Receptacles shall be Hubbell #5253W.

B. Receptacles indicated weatherproof shall have lift cover plates that are weatherproof "while in use" Hubbell/Taymac expandable flat ML450W or equal.

C. Ground fault current interrupter receptacles shall be self-testing, Hubbell # GFR5352WST.

D. Outdoor ground fault circuit interrupter receptacles shall be Hubbell #GFW RST 20W or equal.

E. USB receptacles shall be Hubbell #USB8200W or equal.

2.08 LIGHTING SWITCHES:

A. Line voltage lighting switches shall be specification grade, quiet type, 20 amp. 120/277 volt A.C. white handled, unless otherwise noted. Switches shall be Hubbell #CS1221W.

B. Dimmers shall be specification grade 20 amp, 120/277 volt, white. Specific attributes of dimmers: types, loads, configuration, shall be as shown on the drawings. Dimmers shall match the drivers in the light fixtures that they feed.

C. A neutral conductor shall be routed to each switch and dimmer location.

2.07 WIRE AND CABLE:

A. 600 Volt Conductors:

1. Conductors shall be copper and delivered to the site in their original, unbroken packages plainly marked or tagged with U.L. label, size, kind, insulation, name of manufacturer and trade name of the wire.

2. Type "THWN/THHN", 600-volt insulation shall be used for all locations.

3. Minimum size conductor shall be #12.

4. Conductors shall be stranded.

5. Ground conductors shall be bare copper or have green insulation.

6. 120 volt and 277 volt circuits shall have separate neutrals.

B. MC Luminary Cable:

1. MC Luminary cable may be used for line voltage and 0-10 volt wiring between light fixtures and dimmers.

2. MC Luminary cable shall be UL listed.

3. MC Luminary cable shall be properly supported along its route between fixtures and dimmers.

4. Acceptable manufacturers: Manufacturers shall be one of the following, but not limited to:
   a. AFC
   b. Southwire
   c. General Cable

5. MC Cable sizes shall be as shown on the Drawings.

C. Installation:

1. Conductors shall be continuous between outlets or junction boxes and no splices shall be made except in outlet boxes, pull boxes, panelboard gutters or handholes.

2. Joints, splices and taps No. l0 or smaller (including fixture pigtails) shall be connected with "floating spring" type connectors. No. 8 and larger shall be connected with solderless connectors of 100% electrolytic copper. Split-bolt connectors are not acceptable.

3. Tighten pressure type lugs on panels and equipment, and then retighten 24 hours or more later after energizing. Provide written report of torque values on lugs.

4. Oil or grease shall not be used when pulling conductors. Use U.L. approved cable lubrication only.

5. Lace or train conductors neatly in panels, cabinets and equipment. Use plastic wire ties to route conductors at edge of enclosure away from overcurrent devices.

6. Branch circuits shall be color coded in compliance with Section 210-5 of the California Electrical Code. Colored tape is not acceptable.

7. All wiring, both line and low voltage, shall be installed in conduit unless otherwise noted.

8. Conductors from different panels or from different power sources shall not be installed in the same conduit, junction box, gutter, or raceway.

D. Tag:

1. Branch circuits shall be left tagged with circuit numbers in gutters and junction boxes where unused circuits terminate.

2. Feeder conductors shall be tagged as phase "A" or "B" or "C".

3. The method of tagging shall be with adhesive preprinted tape numbered or lettered wrap around tags. Colored tape is not acceptable.

4. Tagging shall be applied after wire is installed in conduit.

5. Feeders in panel or equipment shall be tagged by phase letter in each panel or equipment.

6. Where it is impractical to use printed markers on certain wires or cables, use blank tape with identification marked thereon with indelible pen or pencil.

E. Color Coding for Phase Identification: Color code secondary service, feeder, and branch circuit conductors with factory applied color as follows:

208y/120Volts	Phase	480y/277Volts
Black	A	Yellow
Red	B	Brown
Blue	C	Orange
White	Neutral	Gray
Green	Ground	Green

2.08 DISCONNECT SWITCHES:

A. Non-fusible or fusible as shown on the Drawings, heavy duty, 250 or 600 volts as required, NEMA Type 1 enclosure, except where WP is indicated or required by code, use NEMA Type 3R enclosure.

2.09 LIGHTING FIXTURES:

A. Lighting fixtures shall be of manufacture and type as specified in the Fixture Schedule, and shall have all parts and fittings necessary to completely and properly install the fixture. Fixtures of the same type shall be of one manufacturer and of identical finish and material.

B. Lighting fixtures shall bear Underwriter's Laboratories labels. Interior light fixtures shall be on the California Energy Commission approved list. Exterior light fixtures shall be on the DLC list.

C. Fixtures shall be furnished and installed as indicated on the Drawings, including hangers, glassware, auxiliary equipment, drivers, adapters, connectors for continuous installation, etc.

D. Each fixture shall be wired with conductors suitable for the voltage, current and temperature to which the conductors will be subjected.

E. If excessive driver flicker develops within 12 months after installation, the condition shall be corrected at no charge to the Owner. Flickering of the LED or failure of an LED array within 12 months of substantial completion shall also be corrected at no charge to the Owner.

F. Proper LEDs of type, size, color temperature and wattage indicated shall be furnished and installed in each fixture and shall be manufactured by Phillips, Sylvania, Cree, Soraa or Bridgelux. The Contractor shall replace LED arrays which have been burned out prior to final completion. Clean dust, dirt, fingerprints and grease from fixtures before final completion.

G. Install trims, reflectors, lenses and diffusers with care. Wear cloth or surgical gloves when installing these to avoid leaving fingerprints.

H. Follow manufacturer's installation instructions when installing light fixtures.

2.10 LED LAMPS:

A. Any LED lamps used shall be JA8 compliant.

B. LED lamps shall be UL listed.

C. LED lamps shall be tested for use in the fixtures they will be installed in.

D. LED lamps shall not cause fixtures to overheat or lamps to prematurely fail.

2.11 PANELBOARDS:

A. Section Includes:

1. Power Distribution Panelboard: Furnish and install distribution panelboard(s) as specified herein and where shown on the associated schedules on Drawings.

2. Lighting and Appliance Panelboard: Furnish and install lighting and appliance panelboard(s) as specified herein and where shown on the associated schedules on Drawings.

B. References: The panelboard(s) and circuit breaker(s) referenced herein are designed and manufactured according to the latest revision of the following Specifications.

1. NEMA PB-1 - Panelboards.

2. NEMA PB-1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

3. NEMA AB 1 - Molded Case Circuit Breakers.

4. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

5. UL 50 - Enclosures for Electrical Equipment.

6. UL 67 - Panelboards.

7. UL 489 - Molded-Case Circuit Breakers and Circuit Breaker Enclosures.

C. Power Distribution Panelboards: (Square D I-Line, no equal)

1. Interior:

a. Shall be rated 600 VAC. Continuous main current ratings as indicated on associated schedules on Drawings not to exceed 1200 amperes maximum. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67.

b. Provide UL Listed short circuit current ratings (SCCR) as indicated on the associated schedules on Drawings not to exceed the lowest interrupting capacity rating of any circuit breaker installed with a maximum of 200,000 rms symmetrical amperes. Main lug and main breaker panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230-F and -G.

c. The panelboard interior shall have three flat bus bars stacked and aligned vertically with glass reinforced polyester insulators laminated between phases. The molded polyester insulators shall support and provide phase isolation to the entire length of bus.

d. The bussing shall be fully rated with sequentially phased branch distribution. Panelboard bussing rated 100 through 600 amperes shall be plated copper. Bussing rated 800 amperes and above shall be plated copper. The entire interleaved assembly shall be contained between two (2) U-shaped steel channels, permanently secured to a galvanized steel-mounting pan by fasteners employing the use of a tamper-resistant warning label.

e. Interior trim shall be of dead-front construction to shield user from all energized parts. Main circuit breakers through 800 amperes shall be vertically mounted. Main circuit breaker and main lug interiors shall be field convertible for top or bottom incoming feed.

f. Equipment ground bar shall be insulated or bonded as shown on the Drawings. Ground bar shall be copper. Solid neutral shall be equipped with a full capacity grounding strap for service entrance applications. Gutter-mounted neutral will not be acceptable.

g. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, UL Listed label, and Short Circuit Current Rating shall be provided. Leveling provisions shall be provided for flush mounted applications.

h. Arc Flash labeling shall be provided in accordance with Section 1.18 of these specifications.

i. Panelboard lugs shall be tightened with a torque wrench to values listed on the equipment.

2. Molded Case Circuit Breakers - Mains and Branches:

a. Common Characteristics:

1) Circuit breakers shall be constructed in accordance with the following standards:

UL 489 Federal Specification W-C-375B/GEN
NEMA AB1 CSA 22.2, No. 5-M91
IEC 157-1 BS 4752

2) Circuit breakers shall be constructed using glass reinforced polyester insulating material providing superior dielectric strength. Current-carrying components shall be completely isolated from the handle and the accessory mounting area.

3) Circuit breakers shall have an overcenter, trip-free, toggle operating mechanism which will provide quick-make, quick-break contact action. The circuit breaker shall have common tripping of all poles.

4) Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.

5) Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.

6) Breaker faceplate shall indicate rated ampacity. Breaker faceplate shall indicate UL and IEC certification standards with applicable voltage systems and corresponding AIR ratings.

7) Circuit breakers shall be factory sealed and shall have a date code on the face of the circuit breaker. Poles shall be labeled with respective phase designations.

   (a) Circuit breakers shall be UL Listed for use with the following accessories: Shunt Trip, Under Voltage Trip, Auxiliary Switch, Alarm Switch, Ground Fault Shunt Trip, Electrical Operators, Cylinder Locks, Mechanical Lugs Kits, Compression Lugs Kits, and Handle Accessories.

8) Lugs shall be UL Listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per NEC Table 310-16. Lug body shall be bolted in place; snap-in designs are not acceptable. Lugs shall be torqued with a torque wrench to the value listed on the circuit breaker.

9) Two- and three-pole circuit breakers shall have an internal common trip crossbar to provide simultaneous tripping. Circuit breaker frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the breaker, which allows the user to simultaneously select the desired trip level of all poles.

10) Standard circuit breakers up to 250 amperes at 600 VAC shall be UL Listed with HACR ratings.

11) Enclosures:

   (a) Type 1 Boxes:
      1. Boxes shall be galvanized steel constructed in accordance with UL 50 requirements. Zinc-coated galvannealed steel will not be acceptable.

2. Boxes shall have removable blank endwalls and interior mounting studs. Interior support bracket shall be provided for ease of interior installation.

3. Maximum enclosure dimensions shall be 42 in. wide and 9.5 in. deep.

(b) Type 1 Trim Fronts:

1. Trim front steel shall meet strength and rigidity requirements per UL 50 standards. Shall have an ANSI 49 medium gray enamel electrodeposited over cleaned phosphatized steel.

2. Trim front shall be [4-piece surface] [1- piece with door] [hinged 1-piece with door] available in [flush] [surface] mount. Trim front door shall have rounded corners and edges free of burrs. A clear plastic directory cardholder shall be mounted on the inside of the door.

3. Locks shall be cylindrical tumbler type with larger enclosures requiring sliding vault locks with 3-point latching. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock.

(c) Type 3R, 4, 4X and 12:

1. Enclosures shall be constructed in accordance with UL 50 requirements. Endwalls shall be welded and sealed. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.

2. All doors shall be gasketed and be equipped with a tumbler type vault lock and two (2) additional trunk type latches. A clear plastic directory cardholder shall be mounted on the inside of door. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock.

3. Maximum enclosure dimensions shall not exceed 42 in. wide and 12.95 in. deep.

D. Lighting and Appliance Panelboard: (Square D NQOD, no equal)

1. Interior:

a. Shall be rated for 240 VAC/48 VDC maximum. Continuous main current ratings, as indicated on associated schedules, not to exceed 600 amperes maximum.

b. Minimum short circuit current rating: As indicated on schedules in rms symmetrical amperes at 240 VAC.

c. Provide one (1) continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors suitable for plug-on or bolt-on branch circuit breakers. The bussing shall be fully rated. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67. Bussing rated 100-400 amperes shall be copper. Bussing rated for 600 amperes shall be copper as standard construction. Panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230-F and G.

d. All current-carrying parts shall be insulated from ground and phase-to-phase by Noryl high dielectric strength thermoplastic or equivalent.

e. Split solid neutral shall be plated and located in the mains compartment up to 225 amperes so all incoming neutral cable may be of the same length.

f. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have pre-formed twistouts covering unused mounting space.

g. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, UL Listed label and short circuit current rating shall be displayed on the interior or in a booklet format.

h. Interiors shall be field converted for top or bottom incoming feed. Main and sub-feed circuit breakers shall be vertically mounted. Main lug interiors up to 400 amperes shall be field convertible to main breaker. Interior leveling provisions shall be provided for flush mounted applications.

i. Panelboard lugs shall be tightened with a torque wrench to values listed on the equipment.

j. Arc Flash labeling shall be provided in accordance with Section 1.18 of these specifications.

2. Main Circuit Breaker:

a. Main circuit breakers shall have an overcenter, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be true rms sensing and be factory calibrated to operate in a 40° C ambient environment. Thermal elements shall be ambient compensating above 40° C.

b. Two- and three-pole circuit breakers shall have common tripping of all poles. Circuit breakers frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the circuit breaker, which allows the user to simultaneously select the desired trip level of all poles. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.

c. Breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.

d. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.

e. Lugs shall be UL Listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per NEC Table 310-16. Lug body shall be bolted in place; snap-in designs are not acceptable. Lugs shall be torqued with a torque wrench to the value listed on the main circuit breaker.

3. Branch Circuit Breakers:

   a. Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the panelboard schedules.

   b. Molded case branch circuit breakers shall have bolt-on type bus connectors.

   c. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.

   d. There shall be two forms of visible trip indication. The breaker handle shall reside in a position between ON and OFF.

   e. The exposed faceplates of all branch circuit breakers shall be flush with one another.

   f. Lugs shall be UL Listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per NEC Table 310-16. Lugs shall be torqued with a torque wrench to the value listed on the main circuit breaker.

4. Enclosures:

   a. Type 1 Boxes:
      1) Boxes shall be galvanized steel constructed in accordance with UL 50 requirements. Galvanized steel will not be acceptable.

      2) Boxes shall have removable endwalls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.

      3) Box width shall be [20 in wide] [14 in wide] [8.625 in wide - NQOB column width only].

   b. Type 1 Fronts:
      1) Front shall meet strength and rigidity requirements per UL 50 standards. Fronts shall have ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.

      2) Fronts shall be hinged 1-piece with door. Mounting shall be as indicated on associated schedules.

   c. Type 3R, 3S, 5, and 12:
      1) Enclosures shall be constructed in accordance with UL 50 requirements. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.

      2) All doors shall be gasketed and equipped with a tumbler type vault lock and two (2) additional trunk type latches. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock. A clear plastic directory cardholder shall be mounted on the inside of door.

      3) Maximum enclosure dimensions shall not exceed 20 in. wide and 6.5 in. deep.

2.11 SURGE PROTECTIVE DEVICES (SPD) (TVSS):

A. Surge protective devices shall be panel integrated.

B. SPDs shall be provided and installed in the panel by the manufacturer.

C. SPD size/rating shall be as shown on the Drawings.

D. SPDs shall be UL listed.

E. Where independent SPDs are used, they shall be installed adjacent to the equipment they serve. The conductor length from the circuit breaker to the SPD shall be minimized.

2.12 MAIN SWITCHBOARD "MSB":

A. The main switchboard shall have a dead front, dead rear with floor standing standardized sections, including underground pull section, metering and distribution section. The bus size and circuit breaker trip settings shall be as indicated on the Drawings. Circuit breakers shall be provided with means for padlocking in the "Off" position. Sections shall be provided with full height bussing. The switchboard shall have facilities for the power company's meters and test apparatus. Sequence of metering shall be as required by the serving utility company. All sections shall be finished in baked grey enamel. Bussing shall be copper. Ground bus and solid neutral shall be provided. Provide plastic laminated nameplate. Support switchboard in accordance with manufacturer's requirements. Provide all required seismic bracing.

B. Main circuit breaker shall be listed and marked for service entrance.

C. Circuit breakers shall be bolt-on type, plastic molded case, trip free with quick-make, quick break operating mechanism.

D. The switchboard sections shall be constructed to conform to the latest sections of applicable IEEE Standards and ANSI Standards. The circuit breakers shall have short-circuit AIC ratings as indicated on the Drawings.

E. Provide plastic, engraved, laminated nameplates for switchboard identification as well as each circuit breaker. Provide a separate plastic, engraved, laminated nameplate with the meter's address.

F. The main switchboard shall have an arc flash label in accordance with Part I, 1.18 Arc Flash Labeling.

END OF SECTION

SECTION 26 72 20
INTERCOMMUNICATIONS SYSTEMS

1.00 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 TYPES OF WORK

A. Provide EMT conduits, junction boxes, cable tray system, j-hooks, raceways, and all supporting components as required to provide a complete cabling distribution system.

B. Provide proposed fire stopping systems and materials and install firestopping with staff trained and certified. Restore and/or replace any such materials that are removed during installation.

C. Provide sub-terminals with fire-rated backboards, relay racks, swing gates, ladder trays, cable routes, and other components as required.

D. Verify exact location and mounting height of cable tray, J-hooks, EMT conduits, J-boxes, and raceway with Owner's Representative prior to installation.

E. Document and label all work per specifications.

F. Provide grounding and bonding as defined in ANSI-J-STD-607-A Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.

1.03 REGULATORY REFERENCES

A. All work and materials shall conform in every detail to the rules and requirements of the National Fire Protection Association, the local Electrical Code and present manufacturing standards.

B. All materials shall be UL Listed and shall be marked as such. If UL has no published standards for a particular item, then other national independent testing standards shall apply and such items shall bear those labels. Where UL has an applicable system listing and label, the entire system shall be so labeled.

C. All modular jacks, patch cords, consolidation point, and patch cords performance shall be verified (not just tested) by a third party to be category 6 or 6A component and channel compliant, as applicable to the component being installed.

D. The cabling system described in this is derived from the recommendations made in recognized telecommunications industry standards. The following documents are incorporated by reference:

1. ANSI/TIA/EIA - 568-C.0, Generic Telecommunications Cabling for Customer Premises
2. ANSI/TIA/EIA - 568-C.1, Commercial Building Telecommunications Cabling Standard.
3. ANSI/TIA/EIA - 568-C.2, Balanced Twisted Pair Cabling Components, Addendum 1 –
4. ANSI/TIA/EIA - 568-C.3, Optical Fiber Cabling Components
5. ANSI/TIA/EIA – 569-A, Commercial Building Standard for Telecommunications Pathways and Spaces, February, 1998.

6. ANSI/TIA/EIA – 606-A, Administration Standard for Telecommunications Infrastructure of Commercial Buildings, February, 2002.
7. ANSI/TIA/EIA – 607-A, Commercial Building Grounding and Bonding Requirements for Telecommunications, August, 1994.
8. ANSI/ TIA/EIA – 758, Customer-Owned Outside Plant Telecommunications Cabling Standard, April 1999.
9. BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM) – latest edition as of the time of this specification issuance.
10. National Fire Protection Agency (NFPA – 70), National Electrical Code (NEC) –2002.

E. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.

F. This document does not replace any code, either partially or wholly. The contractor must be aware of local codes that may impact this project.

1.04 APPROVED CONTRACTOR

A. The Telecommunications Contractor must be a Certified Installer for the products and/or system being supplied. A copy of certification documents must be submitted with the quote in order for such quote to be valid. The Telecommunications contractor is responsible for workmanship and installation practices in accordance with said certification. At least (1) for every (3) members of the copper installation and termination crew must be certified to a Technician Level of training by the product manufacturer or BICSI. At least (1) for every (5) members of the optical fiber installation and termination crew must be certified by the product manufacturer or other approved organizations in Optical Fiber installation and termination practices.

1.05 WORK INCLUDED

A. The work included under this specification consists of furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this structured cabling system in compliance with the specifications and drawings. The Telecommunications contractor will provide and install all of the required material to form a complete system.

B. The work shall include, but not be limited to the following:

1. Furnish and install a complete telecommunication wiring infrastructure as described on the plans and in these specifications.

2. Furnish, install, and terminate all UTP and Optical Fiber cable.

3. Furnish and install all wall plates, jacks, patch panels, and patch cords.

4. Furnish and install all required cabinets and/or racks as required and as indicated.

5. Furnish any other material required to form a complete system.

6. Perform link testing (100% of horizontal and/or backbone links) and certification of all components.

7. Furnish test results of all cabling to the owner on disk and paper format, listed by each closet, then by workstation ID.

8. Adhere and comply with all requirements of the product certification programs.

9. Provide owner training and documentation. (Testing documentation and As- built drawings).

1.06 SUBMITTALS

A. Under the provisions of this request for proposal, prior to the start of work the telecommunications contractor shall:

1. Submit copies of the certification of the company and names of staff that will be performing the installation and termination of the installation to provide proof of compliance of this spec.

2. Submit proof from manufacturer of contractor’s good standing in

manufacturer’s program.

3. Submit appropriate cut sheets and samples for all products, hardware and cabling.

B. Work shall not proceed without the Owner's approval of the submitted items.

C. The telecommunications contractor shall receive approval from the Owners on all substitutions of material. No substituted materials shall be installed except by written approval from the Owner.

1.07 QUALITY ASSURANCE

A. The telecommunications contractor shall staff the project with qualified personnel. All products shall be new and in good condition.

1.08 DELIVERY, STORAGE AND HANDLING

A. Delivery and receipt of products shall be at the site described in the Scope Section.

B. Cable shall be stored according to manufacturer's recommendations as minimum. In addition, cable must be stored in a location protected from vandalism and weather. If cable is stored outside, it must be covered with opaque plastic or canvas with provision for ventilation to prevent condensation and for protection from weather. If air temperature at cable storage location will be below 40 degrees F., the cable shall be moved to a heated (50 degrees F. minimum) location. If necessary, cable shall be stored off site at the contractor's expense.

C. If the telecommunications contractor wishes to have a trailer on site for storage of materials, arrangements shall be made with the Owner.

1.09 DRAWINGS

A. It shall be understood that the electrical details and drawings provided with the specification package are diagrammatic. They are included to show the intent of the specifications and to aid the telecommunications contractor in bidding the job. The telecommunications contractor shall make allowance in the bid proposal to cover whatever work is required to

comply with the intent of the plans and specifications.

B. The telecommunications contractor shall verify all dimensions at the site and be responsible for their accuracy.

C. Prior to submitting the bid, the telecommunications contractor shall call the attention of the Engineer to any materials or apparatus the telecommunications contractor believes to be inadequate and to any necessary items of work omitted.

2.00 – PRODUCTS

2.01 EQUIVALENT PRODUCTS

A. The Owner and engineer have selected specific products that achieve the desired level of performance and preference. The project has been designed around said products. Proposed substitutions must demonstrate equivalent performance in all areas to the satisfaction of the Owner and must be submitted for review at least 10 days prior to bid. The Owner shall not be required to entertain substitutions submitted after bid.

2.02 WORK AREA OUTLETS

A. Work area cables shall each be terminated at their designated work area location in the connector types described in the subsections below. Included are modular telecommunication jacks. These connector assemblies shall snap into a faceplate.

B. The Telecommunications Outlet Assembly shall accommodate:

1. A minimum of four (4) modular jacks.

2. Each modular jack shall match in color and category performance the incoming cable plant to each jack location. (i.e. – if incoming cable plant is a BLUE, Category 6 cable, the modular jack shall match Category 6 performance and shall also be BLUE in color).

3. Additional accommodations for specific locations as noted in the plans for optical fiber and/or additional copper cables as necessary.

4. A blank filler will be installed when extra ports are not used.

5. All modular jacks shall have their circuit number on the faceplate identifier strip.

6. Multiple jacks that are identified in close proximity on the drawings (but not separated by a physical barrier) may be combined in a single assembly. The telecommunications contractor shall be responsible for determining the optimum compliant configuration based on the products proposed.

7. The same orientation and positioning of jacks and connectors shall be utilized throughout the installation. Prior to installation, the telecommunications contractor shall submit the proposed configuration for each outlet assembly for review by the Owner.

8. The modular jack shall incorporate printed label strip on the dust cap module for identifying the outlet. Printed labels shall be permanent and compliant with ANSI/TIA/EIA–606-A standard specifications. Labels shall be printed using a printer such as a Brady hand held printer. Hand printed labels shall not be accepted.

C. Faceplates: The faceplates shall:

1. Be as appropriate to fit the modular jack used.

2. Be UL listed and CSA certified.

3. Be constructed of high impact, ABS plastic UL 94V-0 construction (except where noted otherwise).

4. Shall match the faceplate color used for other utilities in the building or match the color of the raceway if installed in surface raceway.

5. Be compliant with the above requirements along with the following when incorporating optical fiber:
   a. Be a low profile assembly,
   b. Incorporate a mechanism for storage of cable and fiber slack needed for termination,
   c. Position the fiber optic couplings to face downward or at a downward angle to prevent contamination and,
   d. Incorporate a shroud that protects the optical couplings from impact damage.

6. Be available as single-gang or dual-gang.

7. Provide easy access for adds, moves, and changes by front removal of jack modules.

8. Possess recessed designation windows to facilitate labeling and identification.

9. Include a clear plastic cover to protect labels in the designation window.

10. Have mounting screws located under recessed designation windows.

11. Comply with ANSI/TIA/EIA-606-A work area labeling standard.

12. Allow for the UTP modules to be inverted in place for termination purposes.

13. Be manufactured by an ISO 9001 registered company.

D. Voice / Data Jacks:

1. Voice/Data jacks shall be 8-position modular jacks and shall be Category 6 or Category 6A performance (as matching the installed cable plant) as defined by the references in this document including ANSI/TIA/EIA-568-C.2. All pair combinations must be considered, with the worst-case measurement being the basis for compliance. Modular jack performance shall be third-party verified by a nationally recognized independent testing laboratory.

2. The modular jack shall use dual reactance modular contact array.

3. The modular jack shall be both component, link and channel compliant to category specifications in ANSI/TIA/EIA-568-C.

4. The modular jack's performance shall be third-party verified to ANSI/TIA/EIA-568-C Category 6 or Category 6A specifications (as appropriate to match the installed cable plant).

5. The modular jack shall have low emission IDC contacts.

6. The modular jack shall use standard termination practice using 110 impact tool or manufacturer approved termination tool.

7. The modular jack shall be backwards compatible to Category 3, 5, 5e, & 6.

8. The modular jack shall be center tuned to category 6 or category 6A test specifications (as appropriate to match the installed cable plant).

9. Dust covers shall be used on each termination.

2.03 110 COPPER TERMINATION BLOCK

A. The voice cross connect shall be a passive connection between the horizontal termination blocks and the backbone termination blocks. The wall mount frames shall be field terminated kits including all blocks, connecting blocks, and designation strips. Management rings shall be mounted between vertical columns of blocks to provide management of cross-connect wire. Backbone and horizontal blocks shall use 4-pair connecting blocks. Blocks shall be oriented so that backbone terminations are located on the left and horizontal frames are located on the right of the termination field when facing the frame assembly.

2.04 MODULAR PATCH PANELS

A. The Modular Patch Panels shall:
1. Meet category 6A component compliance and be verified by a third-party nationally recognized independent testing laboratory.
2. Use low emission IDC contacts.
3. Use dual reactance technology to enhance the signal-to-noise ratio.
4. Require standard termination practices using a 110 impact tool or manufacturer approved termination tool.
5. Use a single piece IDC housing designed to accept larger Category 6A conductors.
6. Support both T568B and T568A wiring.
7. Include easy to follow wiring labels.
8. Include label fields.
9. Allow for the use of icons.
10. Include full length metal rear cable management.
11. Be available in standard or high density. Installation shall prefer standard density.
12. Be backward compatible to category 3, 5, 5e, and 6.
13. Be center tuned to category 6A test specifications.
14. Design Make: Leviton 49255-H24, 24-port patch panel suitable for Category 6A applications.

2.05 RACKS

A. All racks and wire management shall be of one manufacturer or designed specifically to work together. The equipment rack shall provide vertical cable management and support for the patch cords at the front of the rack and wire management, support, and protection for the horizontal cables inside the legs of the rack. Waterfall cable management shall be provided at the top of the rack for patch cords and for horizontal cables entering the rack channels for protection and to maintain proper bend radius and cable support. Wire management shall also be mounted above each patch panel and/or piece of equipment on the rack. The rack shall include mounting brackets for cable tray ladder rack to mount to the top of the rack. Velcro cable ties shall be provided inside the rack channels to support the horizontal cable. Rack shall be black in color to match the patch panels and cable management.

B. Free-Standing Rack:

1. Free-standing rack shall:
   a. Provide the necessary strain relief, bend radius and cable routing for proper installation of high performance cross connect products, meeting all specifications of ANSI/TIA/EIA-568-C.
      1) Rear channels to securely route distribution cables.
      2) Vertical management “cage” to protect patch cords while allowing easy access for moves, adds and change with individual 1-rack unit fingers and double hinged door.
      3) Include speednuts to reduce assembly time.
   b. Have top cable trough with waterfall and built in patch/horizontal cable distribution separator.
   c. Have EIA hole pattern on front and rear.
   d. Have rack units stamped on the front, on both sides allowing numbering from top-to-bottom or bottom-to-top.
   e. Be available with a 10.5” or 16.25” channel depth.
   f. Be available with hook and loop straps for securing bulk cables inside the vertical U-channels.
   g. Assemble as 19” (483 mm) or 23” (584 mm) with no additional hardware.
   h. Be available with three styles of vertical patch cord management: interbay with latches, cable management rings, or fingerduct with covers.
   i. Provide floor and ceiling access for cable management and distribution.
   j. Provide pre-drilled base for floor attachment of rack.
   k. Be available in a 7 foot version (45 rack units) or an 8 foot version (51 rack units).
   l. Be available in standard color of black.
   m. Be manufactured by an ISO 9001 registered company.
   n. Approved manufacturer/model of free-standing racks are: Chatsworth 48353-703.

E. Wall Mounted Racks:

1. Wall mounted rack shall be one of two types of cabinets with requirements as listed below.

2. Large – surface mounted, enclosed cabinet with tinted front glass, such that I.T. equipment is mounted parallel with finished floor. This type of rack shall be used only where the installed location is normally unoccupied by students, or as noted on plans.

Large wall mounted rack shall:

a. Provide the necessary strain relief, bend radius and cable routing for proper installation of high-performance cross connect products, meeting all specifications of ANSI/TIA/EIA-568-C.
b. Have top cable trough to route patch and distribution cables between racks.
c. Have EIA hole pattern on front and rear.
d. Rack height shall be specified as 36” or 4.0 ft/1.22 m (22 rack units). e. Be available with a 6.5” (165 mm) or 14” (356 mm) channel depth.
f. Be available with hook and loop straps for securing cables inside the vertical U-channels.
g. Be available with vertical cable management rings for cord routing organization and strain relief.
h. Be available with vertical U-channels to protect and conceal distribution cables.
i. Provide floor and ceiling access for cable management and distribution.
j. Have wall mount braces with locator posts for easy wall mounting.
k. Have side access points that allow for access to manage/install distribution cables in the vertical channels.
l. Be available in standard color of black.
m. Be available with double-hinge for easy access to rear of equipment and incoming cable plant.
n. Be manufactured by an ISO 9001 registered company. o. Be installed with additional accessories as follows:
   1) Ground bus kit for equipment and enclosure bonding.
   2) Thermostatically controlled fan kit with integral filter.
p. Approved manufacturers of large wall mounted racks are: Chatsworth Cube-IT with tinted front glass.

3. Small – surface mounted, enclosed cabinet with minimal depth from finished wall, such that I.T. equipment is mounted perpendicular with finished floor. This type of rack shall be used only where installed location is normally occupied by staff or students, or as noted on plans. Small wall mounted rack shall:
   a. Provide the necessary strain relief, bend radius and cable routing for proper installation of high performance cross connect products, meeting all specifications of ANSI/TIA/EIA-568-C.
   b. Have top cable trough to route patch and distribution cables between racks.
   c. Have EIA hole pattern on top and bottom, including door mounting, if applicable.
   d. Cabinet height shall be specified as 42”, which shall contain (5) rack units for equipment and (4) rack units for patch panel space.
   e. Be available with a 6.5” (165 mm) or 14” (356 mm) channel depth.
   f. Be available with hook and loop straps for securing cables inside the vertical U-channels.
   g. Be available with cable management rings for cord routing organization and strain relief.
   h. Provide floor and ceiling access for cable management and distribution.
   i. Have wall mount braces with locator posts for easy wall mounting.
   j. Have side access points that allow for access to manage/install distribution cables in the vertical channels.
   k. Be available in standard color of black.
   l. Be manufactured by an ISO 9001 registered company. m. Be installed with additional accessories as follows:
      1) Ground bus kit for equipment and enclosure bonding.
      2) Thermostatically controlled fan kit with integral filter.
   m. Approved manufacturers of small wall mounted racks are: Hubbell RE- BOX “RE4X” unless otherwise noted.

2.06 HORIZONTAL DISTRIBUTION CABLE

A. All horizontal data station cable and voice cable shall terminate on modular patch panels (copper), or patch/splice cabinets (fiber) in their respective Telecommunications Room or Equipment Room as specified on the drawings.

B. 100 OHM Category 6 UNSHIELDED TWISTED PAIR CABLE (UTP):

1. Physical Characteristics:
   a. The diameter of the insulated conductor shall be .023 in. maximum.
   b. The outer jacket of the overall cable shall be BLUE in color.
   c. Shall consist of (4) twisted pairs.
   d. Shall be suitable for the environment in which they are to be installed.
   e. The color coding of pairs shall be in accordance with T-568B:
      Pair 1 Pair 2 Pair 3 Pair 4
      W-BL; BL W-O; O W-G; G W-BR; BR
   f. The overall diameter of the cable shall be 0.230”nominal.
   g. The ultimate breaking strength measured in accordance with ASTM D 4565 shall be 400 N minimum.
   h. Cable shall withstand a bend radius of 1” at -20 degrees Celsius without jacket or insulation cracking.
   i. Cable shall be third party verified to meet ANSI/TIA/EIA-568-C.2.

2. Transmission Characteristics:
   a. DC resistance of any conductor shall not exceed 9.38 Ohms per 100m max. at 20C. Measured in accordance with ASTM D 4566.
   b. The mutual capacitance of any pair at 1 kHz for 100m of cable shall not exceed 4.4 Nf.
   c. DC resistance unbalance between any two conductors of any pair shall not exceed 3% when measured at or corrected to 20C in accordance with ASTM D 4566.
   d. The capacitance unbalance to ground at 1 kHz of any pair shall not exceed 330 pF per 100m.

3. Cable shall be Berk-Tek LANmark-1000 UTP or approved equal.

4. Cable installed underground/below slab in conduit shall be Berk-Tek LANmark-6 OSP (wet location) or approved equal.

C. 100 OHM Category 6A UNSHIELDED TWISTED PAIR CABLE (UTP):

1. Physical Characteristics:
   a. The diameter of the insulated conductor shall be .023 in. maximum.
   b. The outer jacket of the overall cable shall be WHITE in color.
   c. Shall consist of (4) twisted pairs.
   d. Shall be suitable for the environment in which they are to be installed.
   e. The color coding of pairs shall be in accordance with T-568B:
      Pair 1 Pair 2 Pair 3 Pair 4
      W-BL; BL W-O; O W-G; G W-BR; BR
   f. The overall diameter of the cable shall be 0.320” nominal.
   g. The ultimate breaking strength measured in accordance with ASTM D 4565 shall be 400 N minimum.

h. Cable shall withstand a bend radius of 1.2” at -20 degrees Celsius without jacket or insulation cracking.
i. Cable shall be third party verified to meet ANSI/TIA/EIA-568-C.2.

2. Transmission Characteristics:
   a. DC resistance of any conductor shall not exceed 9.38 Ohms per 100m max. at 20C. Measured in accordance with ASTM D 4566.
   b. The mutual capacitance of any pair at 1 kHz for 100m of cable shall not exceed 5.1 Nf.
   c. DC resistance unbalance between any two conductors of any pair shall not exceed 3% when measured at or corrected to 20C in accordance with ASTM D 4566.
   d. The capacitance unbalance to ground at 1 kHz of any pair shall not

      exceed 330 pF per 100m.

3. Cable shall be Berk-Tek LANmark-10G2 UTP or approved equal.

4. Cable installed underground/below slab in conduit shall be Berk-Tek LANmark series category 6A (wet location) or approved equal.

2.07 FIBER OPTIC CABLE

A. Indoor/outdoor optical fiber non-conductive loose tube HYBRID CABLE with both laser-enhanced multimode and singlemode fiber strands.

1. Each singlemode fiber must adhere strictly to Section 2.7.C.
2. Each multimode fiber must adhere strictly to Section 2.7.B.
3. Physical Characteristics (in addition to those outlined in 2.7B and 2.7C): Overall jacket of the HYBRID style cable shall be Aqua.

B. Indoor/Outdoor Optical Fiber Non-Conductive Loose Tube with Laser Enhanced 50/125 Optical Fibers.

1. Each Multimode Fiber shall be:
   a. Graded-index optical fiber wave-guide with nominal 50/125um- core/cladding diameter, OM4 or better industry rating.
   b. The fiber shall comply with the latest revision of ANSI/EIA/TIA-4920000.
   c. Attenuation shall be measured in accordance with ANSI/EIA/TIA-455-46, 53 or 61.
   d. Information transmission capacity shall be measured in accordance with the latest revision of ANSI/EIA/TIA-455—204. 500 MHz-km @ 1300nm.
   i. Optical Fiber shall be laser optimized and guarantee Gigabit Ethernet distances of 750m/600m for 850nm and 1300nm respectively and 10 gigabit distances of min. 300m for both 850nm and 1300nm.

2. Physical Characteristics:
   a. Shall be suitable for use in both outdoor and indoor applications without the use of a transition at the building entrance.
   b. Shall be suitable for use in risers, plenums and horizontal applications. c. Shall have a dry water blocking system for cable core and buffer tubes. d. Shall be available with a fiber strand count range from 6 to 72.

e. Shall have a 3.0 mm sub-unit diameter.
f. Shall have and be marked with an UL-OFNP and OFN FT6 Flame Rating.
g. Shall comply with the requirements of ICEA S-83-596 & ANSI/ICEA S-87-640.
h. Strength members shall be dielectric and may be either fiberglass or aramid yarn.
i. Suitable for underground or aboveground conduits.
j. Loose Tube fibers shall be color coded in accordance with EIA / TIA 598 with an overall dark blue jacket.
k. Shall have a ripcord for overall jacket.
l. Suitable for operation between -40 to +75 C. m. Shall be UV resistant.
n. Shall be of an all dielectric design.
o. Shall have a maximum installation tension of 300 lbs for cables without dielectric strength member and 600 lbs for cables with dielectric strength members.

3. Design Make: Berk-Tek "Adventum" optical fiber cable with GIGAlite-10FB 50/125, micron fiber or approved equal.

C. Indoor/Outdoor Optical Fiber Non-Conductive Loose Tube with Laser Enhanced 9/125 Optical Fibers.

1. Each Singlemode Fiber shall be:
a. Graded-index optical fiber wave-guide with nominal 9/125um- core/cladding diameter, OS2 or better industry rating.
b. The fiber shall comply with the latest revision of ANSI/EIA/TIA-4920000.
c. Attenuation shall be measured in accordance with ANSI/EIA/TIA-455-46, 53 or 61.
d. Information transmission capacity shall be measured in accordance with the latest revision of ANSI/EIA/TIA-455—204.
e. The measurements shall be performed at 23 degrees C +/- 5 degrees.
f. Maximum attenuation dB/Km @ 1310/1550 nm: 0.4/0.3.
g. Optical Fiber shall be laser optimized and guarantee Gigabit Ethernet distances of >5000m for 1310nm and 10 Gigabit Ethernet distances of >5000m for 1310nm.

2. Physical Characteristics:
a. Shall be suitable for use in both outdoor and indoor applications without the use of a transition at the building entrance.
b. Shall be suitable for use in risers, plenums and horizontal applications. c. Shall have a dry water blocking system for cable core and buffer tubes. d. Shall be available with a fiber strand count range from 6 to 72.
e. Shall have a 3.0 mm sub-unit diameter.
f. Shall have and be marked with an UL-OFNP and OFN FT6 Flame Rating.
g. Shall comply with the requirements of ICEA S-83-596 & ANSI/ICEA S-87-640.
h. Strength members shall be dielectric and may be either fiberglass or aramid yarn.
i. Shall be of an all dielectric design.
o. Shall have a maximum installation tension of 300 lbs for cables without dielectric strength member and 600 lbs for cables with dielectric strength members.

3. Design Make: Berk-Tek “Adventum” OS2 optical fiber cable (Singlemode-AB) with 9/125 micron fiber or approved equal.

2.08 FIBER OPTIC CONNECTORS

A. LC Fiber Optic Connectors:

1. Each LC fiber optical connector shall be factory terminated onto a factory cut and polished “Pig-Tail” in preparation for field termination by fusion splice only. Mechanical field terminations or gel-matched connector types will not be permitted.

2. Each LC Fiber Connector shall:
   a. Be a pre-polished fiber connector with a fiber stub or field-polish fiber connector.
   b. Be available in single mode and multimode versions. c. Have a domed zirconia ferrule.
   d. Be a PC polish type connector.
   e. Accept a nominal fiber diameter of 125 micrometers.
   f. Have a typical insertion loss of 0.1 dB for multimode and 0.1 dB for single mode.
   g. Have repairable tips.
   h. Have an insertion loss change of less than 0.2 dB after 500 reconnects. i. Be stable over an operating range of –40C to +75 degrees C.

3. Design Make: Leviton LC Fiber Optic Connectors or approved equal.

2.09 FIBER OPTIC SPLICE ENCLOSURES

A. All incoming fiber optic cable shall be fusion spliced to pre-terminated and polished “pig-tails” as noted above. This fusion splice shall be mechanically protected using a splice enclosure with modular fiber patching bulk-heads. Each fiber optic splice enclosure shall be mounted inside a physically secure cabinet, or mounted to a free-standing rack inside an IT designated area on premises. Each fiber optic splice enclosure shall:

1. Be able to use interchangeable bulk-heads for both single-mode and multi-mode patching.

2. Be able to hold one or more 12-strand splice trays

3. Splice trays shall be:
   a. Capable of handling maximum of 12 fiber splices per tray, including heat-shrink.
   b. Capable of being stacked for using in multi-tray installations

4. Contain integral strain-relief for installed fiber plant.

5. Be installed with all un-used positions in fiber bulk-heads populated with dust- caps.

6. Be manufactured by an ISO 9001 registered company

7. Design Make:
   a. Installations with 12 or fewer strands shall use Corning “SPH-01P”.
   b. Installations with more than 12 strands shall use Leviton OPT-X 1000i series.

2.10 COPPER CABLE PROTECTION UNITS

A. All copper circuits shall be provided with protection between each building with an entrance cable protector panel. All building-to-building circuits shall be routed through this protector. The protector shall be connected with a #6 AWG copper bonding conductor between the protector ground lug and the TC ground point. Approved manufacturer of protection units is Porta Systems.

2.11 PATCH CORDS

A. The contractor shall provide factory terminated and tested UTP and optical fiber patch cords and equipment cords for the complete cabling system. The UTP patch cables shall meet the requirements of ANSI/TIA/EIA-568-B for patch cord testing.

B. Copper (UTP) patch cords shall:

1. Use 8-position connector with impedance matched contacts and designed using dual reactance.

2. Be constructed of 100 ohm, 4 pair stranded conductor, unshielded twisted pair copper per the requirements of the ANSI/TIA/EIA-568-B.2 and ANSI/TIA/EIA-568-B.2–1 standard.

3. Meet TIA category 6 or 6A corresponding to the matching cable plant component specifications in ANSI/TIA/EIA-568-B.2-1

4. 100% factory tested to meet category 6 or 6A corresponding to the matching cable plant performance.

5. ETL or any other nationally recognized 3rd party verification

6. Be center tuned to category 6 performance specifications by using paired bi- level contact array.

7. Be capable of universal T568A or T568B wiring schemes.

8. Modular connector shall maintain the paired construction of the cable to facilitate minimum untwisting of the wires.

9. Have a performance marking indelibly labeled on the jacket (by the manufacturer).

10. Have the ability to accept color-coded labels and icons to comply with ANSI/TIA/EIA-606-A labeling specifications.

11. Have “snagless” protection for the locking tab to prevent snagging and to protect locking tab in tight locations and provide bend relief.

12. Be provided and installed in colors that match installed cable plant.
    a. Cables with Category 6 performance shall be BLUE.
    b. Cables with Category 6A performance shall be WHITE.

13. Be available in 3 foot, 5 foot, 7 foot, 9 foot, and 15 foot standard lengths.

14. Be backwards compatible to Category 3, 5 and 5e.

15. Be manufactured by an ISO 9001 registered company.

C. Optical Fiber patch cords shall:

1. Contain two (2) multi-mode or single mode optical fibers, corresponding with the matching installed cable plant.

2. Use multi-mode, graded-index fibers with a 50 micron core or use single mode fibers with a 9 micron core, corresponding with installed cable plant.

3. Be capable of transmission at both 850 nm and 1300 nm wavelengths for multi-mode and 1310 nm and 1550 nm for single-mode.

4. Include listing of actual loss of patchcord when packaged.

5. Be manufactured in standard lengths of 1 m (3.27 ft), 2 m (6.56 ft), 3 m (9.84 ft), 4 m (13.11 ft), 7 m (22.95 ft), and 10 m (32.79 ft), and special ordered in any other lengths.

6. Be manufactured by an ISO 9001 registered company.

2.12 GROUNDING AND BONDING

A. The facility shall be equipped with a Telecommunications Bonding Backbone (TBB). This backbone shall be used to ground all telecommunications cable, shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential to act as a current carrying conductor. The TBB shall be installed independent of the building's electrical and building ground and shall be designed in accordance with the recommendations contained in the ANSI/TIA/EIA-607 Telecommunications Bonding and Grounding Standard.

B. The main entrance facility/equipment room in each building shall be equipped with a telecommunications main grounding bus bar (TMGB). Each telecommunications room shall be provided with a telecommunications ground bus bar (TGB). The TMGB shall be connected to the building electrical entrance grounding facility. The intent of this system is to provide a grounding system that is equal in potential to the building electrical ground system. Therefore, ground loop current potential is minimized between telecommunications equipment and the electrical system to which it is attached.

C. All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, ungrounded conduits, etc. entering or residing in the TR or ER shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors.

D. All wires used for telecommunications grounding purposes shall be identified with a green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape. All cables and bus bars shall be identified and labeled in accordance with the System Documentation Section of this specification.

2.13 FIRESTOP

A. A firestop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, smoke, heat,

vapor and pressurized water stream.

B. All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly firestopped.

C. Firestop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by a qualified Professional Engineer (PE), licensed (actual or reciprocal) in the state where the work is to be performed. A drawing showing the proposed firestop system, stamped/embossed by the PE shall be provided to the Owner's Technical Representative prior to installing the firestop system(s).

3.00 – EXECUTION

3.01 WORK AREA OUTLETS

A. Cables shall be coiled in the in-wall or surface-mount boxes if adequate space is present to house the cable coil without exceeding the manufacturer's bend radius. In hollow wall installations where box-eliminators are used, excess wire can be stored in the wall. No more than 12" of UTP and 12" of fiber slack shall be stored in an in-wall box, modular furniture raceway, or insulated walls. Excess slack shall be loosely coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable.

B. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-C.0 document, manufacturer's recommendations and best industry practices.

C. Pair untwist at the termination shall not exceed 12 mm (one-half inch).

D. Bend radius of the horizontal cable shall not be less than 4 times the outside diameter of the UTP cable.

E. The cable jacket shall be maintained to within 25mm (one inch) of the termination point.

F. Data jacks, unless otherwise noted in drawings, shall be located in the bottom position(s) of each faceplate. Data jacks in horizontally oriented faceplates shall occupy the right-most position(s).

G. Voice jacks shall occupy the top position(s) on the faceplate. Voice jacks in horizontally oriented faceplates shall occupy the left-most position(s).

3.02 HORIZONTAL DISTRIBUTION CABLE INSTALLATION

A. Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.

B. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.

C. Cable raceways shall not be filled greater than the ANSI/TIA/EIA-569-A maximum fill for the particular raceway type or 40%.

D. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.

E. Where transition points, or consolidation points are allowed, they shall be located in accessible locations and housed in an enclosure intended and suitable for the purpose.

F. The cable's minimum bend radius and maximum pulling tension shall not be exceeded.

G. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of 48 to 60 inch (1.2 to 1.5 meter) intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.

H. Horizontal distribution cables shall be bundled in groups of no more than 50 cables. Cable bundle quantities in excess of 50 cables may cause deformation of the bottom cables within the bundle and degrade cable performance.

I. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.

J. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the contractor shall install appropriate carriers to support the cabling.

K. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.

L. Cables shall be identified by a self-adhesive label in accordance with the System Documentation Section of this specification and ANSI/TIA/EIA-606-A. The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate.

M. Unshielded twisted pair cable shall be installed so that there are no bends smaller than four times the cable outside diameter at any point in the run and at the termination field.

N. Pulling tension on 4-pair UTP cables shall not exceed 25-lbf for a four-pair UTP cable.

O. Cables installed underground or below slab shall be suitable for use in wet locations and outdoors in duct or conduit. If wet location cable is exposed in the building after exiting the wet area, it must transition to an appropriate category dry cable within 50 feet (15M) of exiting conduit.

3.03 HORIZONTAL COPPER TERMINATION AND INSTALLATION

A. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-C standard, manufacturer's recommendations and best industry practices.

B. Pair untwist at the termination shall not exceed 13 mm (0.5 inch).

C. Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.

D. Cables shall be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.

E. The cable jacket shall be maintained as close as possible (within 25mm – 1 inch) to the termination point.

F. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

3.04 OPTICAL FIBER TERMINATION HARDWARE

A. Fiber slack shall be neatly coiled within the fiber splice tray or enclosure. No slack loops shall be allowed external to the fiber panel.

B. Each cable shall be individually attached to the respective splice enclosure by mechanical means. The cables strength member shall be securely attached the cable strain relief bracket in the enclosure.

C. Each fiber bundle shall be stripped upon entering the splice tray and the individual fibers routed in the splice tray.

D. Each cable shall be clearly labeled at the entrance to the splice enclosure. Cables labeled within the bundle shall not be acceptable.

E. A maximum of 12 strands of fiber shall be spliced in each tray. F. All spare strands shall be installed into spare splice trays.

F. All terminated strands shall be accounted on patch-panel labels which follow District labelling standards.

G. All un-used fiber positions in fiber termination bulk-head (also known as adapter plate) shall be populated with manufacturer provided dust caps.

3.05 BACKBONE CABLE INSTALLATION

A. Backbone cables shall be installed separately from horizontal distribution cables.

B. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.

C. Where cables are housed in conduits, the backbone and horizontal cables shall be installed in separate conduits

D. Where backbone cables are installed in an air return plenum, riser rated cable shall be installed in metallic conduit.

E. Where backbone cables and distribution cables are installed in a cable tray or wireway, backbone cables shall be installed first and bundled separately from the horizontal distribution cables.

F. All backbone cables shall be securely fastened to the sidewall of the TR on each floor.

G. Backbone cables spanning more than three floors shall be securely attached at the top of the cable run with a wire mesh grip and on alternating floors or as required by local codes.

H. Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable.

I. Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.

3.06 RACKS

A. Racks shall be securely attached to the concrete floor using a minimum 3/8” hardware or as required by local codes.

B. Racks shall be placed with a minimum of 36-inch clearance from the walls on all sides of the rack. When mounted in a row, maintain a minimum of 36 inches from the wall behind and in front of the row of racks and from the wall at each end of the row.

C. All racks shall be grounded to the telecommunications ground bus bar in accordance with Section 9.0 of this document.

E. Rack mount screws not used for installing patch panels and other hardware shall be bagged and left with the rack upon completion of the installation.

E. Wall mounted termination block fields shall be mounted on 4’ x 8’ x .75” void free plywood. The plywood shall be mounted vertically 12” above the finished floor. The plywood shall be painted with two coats of white fire-retardant paint.

F. Wall mounted termination block fields shall be installed with the lowest edge of the mounting frame 18” from the finished floor.

3.07 FIRESTOP SYSTEM

A. All firestop systems shall be installed in accordance with the manufacturer’s recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cable system acceptance.

3.08 GROUNDING SYSTEM

A. The TBB shall be designed and/or approved by a qualified PE, licensed in the state that the work is to be performed. The TBB shall adhere to the recommendations of the ANSI/TIA/EIA-607 standard, and shall be installed in accordance with best industry practice.

B. Installation and termination of the main bonding conductor to the building service entrance ground shall be performed by a licensed electrical contractor.

3.09 IDENTIFICATION AND LABELING

A. The contractor shall provide and install a complete labeling system for the inter-communications installation in accordance with ANSI/TIA/EIA-606A, and identified using the following methodology:

1. FACEPLATES (Workstation Outlets): Faceplates in work areas shall be labeled consecutively starting at “1” and incrementing moving in a clockwise motion around

each room. Index “1” in each room shall begin at the occupant entrance to the room and shall increment at each occurrence of a new/different faceplate in a clockwise and outermost-to-innermost pattern (spiraling inward). In this manner, labeling of wall outlets will be done first, and floor-boxes will be labeled next.

a. The following special configuration prefixes shall be used in front of the nameplate index and port position:
   1) Wireless Access Points: shall have additional “WAP” prefix to the index assigned by method 1 above. (Example: WAP2A and WAP2B may share a 2-port biscuit)
   2) 2) IP enabled speakers: shall have additional “SPK” prefix to the index assigned by method 1 above. (Example: SPK3A)
   3) IP enabled cameras: shall have additional “CAM” prefix to theindex assigned by method 1 above. (Example: CAM1A)
b. Labeling within each faceplate (or biscuit): Each modular jack shall be identified by a letter to index the individual port within any faceplate, starting at the letter “A”. Each port shall be indexed starting in the upper-left and incrementing right-to-left first and then top-to-bottom.

2. RACK EQUIPMENT: Intermediate Distribution Frames (IDF) and Main Distribution Frames (MDF) shall be labeled according to their District-wide recognized room name at the time of installation. The IDF or MDF shall be labelled according to the following naming template:
   a. Small telecom cabinet shall be of the format: “TIC” <ROOM NAME> (Example: TIC901B is a small IDF cabinet in room 901B).
   b. Large telecom cabinet or IDF rack shall be of the format: “IDF” <ROOM NAME> (Example: “IDF1205” for a free-standing 2-post rack in room 1205).
   c. MDF room equipment shall be of the format: “MDF” <ROOM NAME> (Example: “MDF-LIB01” for the main distribution frame in room LIB01)
   d. During construction, a room name may not correspond to the District recognized room name, therefore Contractor shall seek approval from District IT for recognized room names prior to start of labeling.
   e. If more than one rack within the IDF or MDF is installed, contractor shall seek special instructions on naming conventions.

B. The labeling system shall clearly identify all components of the system: racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination within the system. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme. Labeling shall follow the guidelines of ANSI/TIA/EIA-606-A.

C. Outside Plant cables passing through a pull box or vault shall have a cable label that is water and mud proof.

D. All label printing will be machine generated by Ortronics LabelMo, or similar software, using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination point on each end. Outlet, patch panel and wiring block labels shall be installed on, or in, the space provided on the device.

3.10 FIBER OPTIC DATA CHANNEL

A. All fiber optic strands within a fiber optic cable shall be installed so as to complete an end-to-end, full-duplex data channel, known as the cable plant. The cable plant shall only be

connected at each end to active optical networking equipment/electronics via one patch cable at each end of the installed cable plant. Cable plant shall not be “cross-patched” from one fiber pair to another, even at a specified fiber bulk-head, without explicit approval from Engineer and Owner.

B. Data throughput shall only be limited by the characteristics of the cable or the capability of the active electronics equipment attached. Cable shall not be limited by channel disturbances, such as kinks, breaks, tears, lossy splices, mating optical patches, etc.

C. Where plans or specifications call for additions or modifications to an existing fiber channel, Contractor shall only complete the addition or modification using approved fiber optic cable fusion splices, in submitted and approved termination enclosures.

3.11 HORIZONTAL COPPER DATA CHANNEL

A. All 4-pair, 8-position copper data cables (Category cabling) shall be installed as a complete end-to-end, full duplex ethernet channel, known as the cable plant. The cable plant shall only be connected at each end to active networking equipment/electronics via one patch cable at each end of the installed cable plant. Cable plant shall not be “cross-patched” from one ethernet cable to another without explicit approval from Engineer and Owner.

B. Data throughput shall only be limited by the characteristics of the cable or the capability of the active electronics equipment attached. Cable shall not be limited by channel disturbances, such as kinks, breaks, tears, additional patch cables, additional punch-downs, etc.

C. Where plans or specifications call for additions or modifications to an existing data channel, Contractor shall only complete the addition or modification using approved fiber optic cable fusion splices, in submitted and approved termination enclosures.

3.12 TESTING AND ACCEPTANCE

A. General:

1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-B. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.

2. All cables shall be tested in accordance with this document, the ANSI/TIA/EIA standards, the Certification Program Information Manual provided by the product manufacturer and best industry practice. If any of these are in conflict, the Contractor shall bring any discrepancies to the attention of the project team for clarification and resolution.

B. Copper Link Testing:

1. All twisted-pair copper cable links shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below. Additional testing is required to verify Category performance.

2. Horizontal cabling shall be tested using a Level III test unit for category 6 and category 6A performance compliance, corresponding with the installed cable type.

3. The basic tests required are:
   a. Wire Map b. Length
   c. Attenuation
   d. NEXT (Near end crosstalk)
   e. Return Loss
   f. ELFEXT Loss
   g. Propagation Delay h. Delay skew
   h. PSNEXT (Power sum near-end crosstalk loss)
   i. PSELFEXT (Power sum equal level far-end crosstalk loss)

4. Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests. The test shall be recorded as pass/fail as indicated by the test unit in accordance with the manufacturers' recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.

5. Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA/EIA-568-C Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.

6. Category 6 Performance shall meet the link requirements outlined below for a 90-meter, 4-connector permanent link.

Frequency (MHz)	Maximum Insertion (dB)	Minimum NEXT (dB)	Minimum PSNEXT (dB)	Minimum ELFEXT (dB)	Minimum PSELFEXT Loss (dB)	Minimum Return Loss (dB)
1.0	2.1	69.0	64.0	65.3	62.3	21.0
4.0	4.0	67.0	62.5	53.2	50.2	21.0
10.0	6.3	60.6	46.0	45.3	42.3	21.0
20.0	9.0	55.6	51.0	39.2	36.2	21.0
31.25	11.3	52.4	47.7	35.4	32.4	19.1
62.5	16.4	47.4	42.6	29.3	26.3	16.1
100.0	21.2	43.9	39.1	25.3	22.3	14.0
155.0	26.6	40.7	35.8	21.4	18.4	12.1
200.0	31.5	38.8	33.9	19.2	16.2	11.0
250.0	36.0	37.1	32.4	17.3	14.3	10.0

7. Category 6A performance shall meet the link requirements outlined below for a 90-meter, 4-connector permanent link.

Frequency (MHz)	Maximum Insertion Loss	Minimum NEXT (dB)	Minimum PSNEXT (dB)	Minimum ELFEXT (dB)	Minimum PSELFEXT (dB)	Minimum Return Loss (dB)
1.0	2.1	74.3	72.3	-	-	20.0
4.0	3.8	65.3	63.3	-	-	23.0
10.0	5.9	59.3	57.3	-	-	25.0
16.0	7.5	56.2	54.2	-	-	25.0
20.0	8.4	54.8	52.8	-	-	25.0
31.25	10.5	51.9	49.0	-	-	23.6
62.5	15.0	47.4	45.4	-	-	21.5
100.0	19.1	44.3	42.3	-	-	20.1
250.0	31.1	38.3	36.3	-	-	17.3
350.0	37.2	36.1	34.1	-	-	16.3
400.0	40.1	35.3	33.3	-	-	15.9
500.0	45.3	33.8	31.8	-	-	15.2

NOTE: For ELFEXT and PSELFEXT, follow TIA guidelines for Cat6A.

C. Fiber Testing:
1. All fiber testing shall be performed on all fibers in the completed end-to-end system. Testing shall consist of an end-to-end power meter test performed per EIA/TIA-455-53A. The system loss measurements shall be provided at 850 and/or 1300 nanometers for multimode fibers and 1310 and/or 1550 nanometers for single mode fibers. These tests also include continuity checking of each fiber.
2. Backbone multimode fiber cabling shall be tested at both 850 nm and 1300 nm (or 1310 and 1550 nm for singlemode) in both directions.
3. Test set-up and performance shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, Method B.
4. Where links are combined to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. ONLY LINK TEST IS REQUIRED. The values for calculating loss shall be those defined in the ANSI/TIA/EIA Standard.
5. Attenuation testing shall be performed with an approved hand-held tester from an industry recognized test equipment manufacturer.

3.13 SYSTEM INTEGRATION AND TESTING

A. Contractor shall provide to client representative, at contract notice to proceed, a list of all devices and/or locations where equipment is noted on plans as “District” or “Owner” provided. Contractor shall be responsible for coordinating the receipt and safe handling of each piece of equipment until installation is complete.

B. Equipment provided by the client shall be handled and installed by the Contractor, this may include network switches, Wireless Access Points, Power-Over-Ethernet injectors, security cameras, etc. All equipment shall be installed by the Contractor in their respective locations as shown on the plans.

C. Upon complete install of the equipment, Contractor shall provide and install appropriate patching of equipment to network infrastructure (Cat 6, Cat 6A, fiber- optic cable, etc.) as necessary to deliver a fully functional network solution.

3.14 SYSTEM DOCUMENTATION

A. Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Engineer for approval. Documentation shall include the items detailed in the sub-sections below.

B. Documentation shall be submitted within ten (10) working days of the completion of each testing phase (e.g. subsystem, cable type, area, floor, etc.). This is inclusive of all test result and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 working days of the completion of each testing phase. At the request of the Engineer, the telecommunications contractor shall provide copies of the original test results.

C. The Engineer may request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the tele-communications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re- test shall be at no additional cost to the Owner.

3.15 TEST RESULTS

A. Test documentation shall be provided on disk within three weeks after the completion of the project. The disk shall be clearly marked on the outside front cover with the words “Project Test Documentation”, the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment. The test documentation shall be compatible with common, license-free computer software such as Adobe Acrobat (PDF), or with Microsoft Excel or Word.

B. The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-C including applicable TSB’s and amendments. The appropriate Level III tester shall be used to verify Category 6 cabling systems.

C. Printouts generated for each cable by the wire (or fiber) test instrument shall be submitted as part of the documentation package. The telecommunications contractor must furnish this information in electronic form CD-ROM). If needed, provide manufacturers software require to read the test results.

D. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

4.00 - WARRANTY AND SERVICES

4.01 WARRANTY

A. The manufacturer shall provide the warranty directly to the end-user.

B. An Extended Product Warranty shall be provided which warrants functionality of all components used in the system for a minimum of 20 years from the date of registration. The Extended Product Warranty shall warrant the installed horizontal and/or backbone copper, and both the horizontal and the backbone optical fiber portions of the cabling system.

C. The Application Assurance Warranty shall cover the failure of the wiring system to support the applications that are designed for the link/channel specifications of ANSI/TIA/EIA–568-C.0. These applications include, but are not limited to, 10BASE-T, 100BASE-T, 1000BASE-T, 10GBASE-T, 155Mb/sATM, and 1Gb/s ATM.

D. The contractor shall provide a warranty on the physical installation.

4.02 FINAL ACCEPTANCE AND SYSTEM CERTIFICATION

A. Completion of the installation, in-progress and final inspections, receipt of the test and as-built documentation, and successful performance of the cabling system for a two-week period will constitute acceptance of the system. Upon successful completion of the installation and subsequent inspection, the end user shall be provided with a numbered certificate, from the product manufacturer, registering the installation.

END OF SECTION

SECTION 32 80 00
LANDSCAPE IRRIGATION

PART 1 – GENERAL

1.01 SCOPE

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

B. Includes furnishing all labor, materials, tools and equipment required to provide and install the irrigation system specified herein and required to complete the work per the Plans.

C. Related work:

1. Section 32 90 00 – Landscape Planting;
2. Section 32 92 16 – Hydroseeding.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with all local and state codes, ordinances, safety orders, and regulations of all legally constituted authorities having jurisdiction over this work.

B. Obtain and pay for all necessary permits and all inspections required by authorities stated above.

C. Notify the Landscape Architect in the event any equipment or methods indicated on the Drawings or in the specifications conflict with local codes, prior to installation. In the event this notification is not performed, the Contractor must assume full responsibility for revisions necessary.

1.03 PROTECTION

A. Contractor shall call *DIG ALERT,* ((1) (800) 642-2444), a minimum of 48 hours prior to any excavation.

B. Contractor shall check for located existing structures, electric cables or conduits, utility lines and other existing features or conditions above or below ground level that might be damaged as a result of this operation. Questions or conflicts arising out of such examination prior to or during operation shall be immediately directed to the attention of the Landscape Architect for necessary action or decisions before resuming operations. Contractor shall be responsible for repair or replacement, at no cost to District, for features or condition damaged through failure to comply with above procedures.

1.04 SUBMITTALS

A. Record Drawings: Maintain information daily. Keep updated drawings onsite at all times for review by the School District Representative(s).

1. The Contractor shall maintain on a daily basis a complete and accurate set of record drawings. These drawings must be kept up-to-date at all times with the progress of the work. The District shall furnish a set of drawings on which to record changed conditions.
2. The Contractor shall indicate clearly all work installed differently from that shown on the contract drawings. By dimensioning from two permanent points of

reference (building corner, sidewalk or road intersections), show connection to existing water lines, connection to existing electrical power, gate valves, pressure supply pipe, control valves, control wiring, automatic controller, quick coupler valves, sleeve locations, and other related equipment as directed by the District's representative.

3. Use appropriate eradication methods for removing original lines and dimensions where changes are made. Completed reproducibles shall be equal to the original drawings. Mark record set(s) with red erasable pencil.

4. Submit 14 days prior to final inspection, one set of marked-up Contract drawings.

5. After approval, the Contractor shall obtain one (1) set of transparencies of the contract drawings from the Landscape Architect, and all changes as noted on the redlined set shall be drawn on the transparencies with waterproof ink. The Contractor shall sign the transparencies as complete and accurate records of as-built work. This set of transparencies shall be delivered to the Landscape Architect for final approval, after which the Contractor shall make copies for the District, Landscape Architect, and other applicable parties.

B. Controller Charts

1. Record drawings shall be approved by the Landscape Architect before charts are prepared.

2. Provide one controller chart for each controller supplied.

3. The chart shall show each area controlled by automatic controller and shall be the maximum size controller door will allow.

4. The chart is to be a reduced drawing of the actual constructed system. However, in the event the controller sequence is not legible when the drawing is reduced, it shall be enlarged to a size that will be readable. This may involve providing more than one chart.

5. The chart will be a blackline print and a different color shall be used to show area of coverage for each station.

6. When completed and approved, the chart shall be hermetically sealed between two pieces of plastic, each piece being a minimum of 20 mils thick.

7. The chart shall be mounted using Velcro, or an approved equal type of tape. If the controller door is constructed with a pre-manufactured pocket for the controller chart, the Velcro mounting may be omitted.

8. These charts shall be completed and approved prior to final inspection of the irrigation system.

C. Checklist

1. Provide a signed and dated checklist and deliver to the School District's Representative prior to final review of the work. Use the following format.

- Confirmation of service pressure: psi., by whom and date.
- Plumbing permits: if none required, so note.
- Materials furnished: received by and date.

- Material approvals: approved by and date
- Pressure line tests: by whom and date
- Record drawings: received by and date
- Controller charts: received by and date
- Operations and maintenance manuals: received by and date
- System and equipment operation instructions: received by and date
- Manufacturer's warranties, if required: received by and date
- Written guarantee: received by and date

D. Manufacturers Catalogs

1. Submit for approval, manufacturer's catalogs on all material to be used on the project (PDF). These catalogs are to be submitted 30 days prior to the start of any work.

E. Additional Submittals

1. For any submittals which necessitate additional research on the part of the Landscape Architect, to prove the product is acceptable, the Contractor will be charged on an hourly basis for this additional work.

F. Approvals and Rejections

1. Equipment or materials furnished or installed without prior approval of the District's representative may be rejected and the Contractor required to remove and replace such materials from the site at no cost to the District.

1.05 DRAWINGS

A. For purposes of legibility, sprinkler lines are essentially diagrammatic. Although size and location of irrigation equipment are drawn to scale wherever possible, the Contractor shall make use of all data in all of the contract documents and verify this information at construction site.

B. Interpretations: Drawings and specifications are intended to be fully cooperative and to agree. However, if the Contractor observes that the drawings and specifications are in conflict, he shall promptly notify the Landscape Architect in writing (prior to bidding and/or construction). The specification calling for any higher quality material or workmanship shall prevail. Questions regarding interpretation of drawings and specifications shall be clarified by the Landscape Architect.

1.06 PERFORMANCE REQUIREMENTS

A. Unless otherwise provided, irrigation system layout shown on the plan shall be considered schematic. With the Landscape Architect's approval, the Contractor may make adjustments where necessary to conform to actual field conditions. The irrigation system shall be operational, with uniform and adequate coverage of areas to be irrigated, prior to planting.

1. Utility connections shall be as shown on the plan or designated by the utility company. The Contractor shall include in his bid all costs for such utility connections shown on the plans or designated by the utility company.

B. Water Supply

1. The sources of water supply shall be as indicated on the drawings as P.O.C., "Point of Connection".

C. Contractor Responsibility

1. The Contractor shall ensure full coverage of the irrigation system and shall make all approved modifications necessary to accomplish full coverage.

2. Contractor shall not willfully install the plumbing or sprinkler system as indicated on the drawings when it is obvious in the field that there are obstructions, grade difference and/or discrepancies in area dimensions until such conditions are brought to the attention of the Landscape Architect.

1.07 PRE-CONSTRUCTION CONFERENCE

A. The Contractor shall schedule with the Landscape Architect and Districts Representative a pre-construction conference at least seven (7) days before beginning work under this section. Purpose of this conference will be:

1. Review Contractor's questions regarding this project.
2. Review administrative and inspection procedures that will occur during construction.
3. Review Contractor's work schedule for this project.
4. Verification of Contractor's C-27 License, Bonding and Insurance.

PART 2 - PRODUCTS

2.01 GENERAL

A. All irrigation equipment: shall be new and unused prior to installation; and shall conform to the Irrigation Plan, Legend and Specifications.

B. Irrigation equipment, which has been damaged in any way, shall be replaced by the Contractor at no additional cost to the District. If equipment has already been installed, it shall be removed and replaced by the Contractor at no additional cost to District.

2.02 PLASTIC PIPE AND FITTINGS

A. Plastic Pipe

Shall be rigid, high impact, Type I, unplasticized polyvinyl chloride (PVC) extruded from virgin parent material Geon 8700A or Geon 8714. Contractor shall furnish for each shipment delivered, a statement from the manufacturer certifying use of virgin material only. The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, deleterious wrinkles or dents and shall conform to the following dimensions and physical properties:

1. All plastic pipe shall be continuously and permanently marked with the manufacturer's name, kind of pipe, material size, IPS NFS approval, schedule and type, and date of extrusion.

2. Plastic pipe shall be as manufactured by Lasco, Celanese, Pacific Western, John Manville, Brownline, Inc. or approved equal.

B. Main Line

1. Piping on the pressure side of irrigation control valves to be PVC Class 315, meeting ASTM-D2241, Type I, Grade I PVC-1120 Cell Class 12454-B specifications.

C. Lateral Lines

1. Piping under intermittent pressure shall be PVC 1120-1220, Sch.40 and shall conform to ASTM D1785.

D. Control Wire Conduit

1. Plastic pipe used as conduit for 24v. direct burial wire shall be PVC 1120-1220, Sch.40 and shall conform to ASTM D1785 (use gray Sch.80 wherever conduit is exposed, and sweep ells at all corners, above and below grade).

F. Fittings and Connections

1. Plastic PVC slip fittings shall be standard weight Schedule 40 (2" & smaller) and Schedule 80 (2.5" and larger) to meet ASTM D2466-73 and D2467-73.

2. All threaded nipples and fittings shall be standard weight Schedule 80 to meet ASTM 80 D2466-73 and D2467-73.

3. Polyethylene drip system connection shall be RIS 5/8" insert or compression type fittings.

2.03 GALVANIZED PIPE AND FITTINGS

A. Where indicated on the drawings, use galvanized steel pipe ASA Schedule 40 mild steel screwed pipe.

B. Fittings shall be medium galvanized screwed beaded malleable iron. Galvanized couplings may be a merchant coupling.

2.04 WATER METERS

A. Shall be installed by others at District's expense.

2.05 BACKFLOW PREVENTION

A. The backflow prevention device shall be as designated on the drawings or as approved by local governing body. The device shall be equipped with gate valve shutoffs and test cocks.

B. Pressure Gauge: Shall be liquid filled, impact, weather & chemical resistant, and installed on downstream side of backflow prevention device. Gauge shall read from 0-200 psi.

C. Cover: Cover shall be insulated pillowcase type (green) with grommets for lock. Install lock and provide 2 keys to owner.

2.06 SLEEVE MATERIAL

A. For control wires: PVC Schedule 40 (of sufficient diameter for ease of pulling, with minimum 50% expansion area.

B. For water lines: PVC Schedule 40 (minimum 2 times line diameter).

C. For drip tubing: PVC Schedule 40 (minimum 2 times line diameter).

2.07 AUTOMATIC CONTROLLER

A. Automatic controller shall be of the size and type shown on the plans.

1. Unless otherwise noted on the plans, the 120 volt electrical power to the automatic controller location to be furnished by others. The final hookup shall be the responsibility of the Contractor. Plastic pipe used as conduit for 120v. electrical wire shall be grey PVC Sch.80 manufactured in accordance with NEMA, UL and WC specifications.

2. The final hookup of any/all low-voltage control wires installed shall be the responsibility of the Landscape Contractor.

B. Remote control for automatic controller(s) shall be Rainmaster Pro Max. Provide/install transmitters, permanent receiver cards, antennas, and all cables and adapters necessary for each clock. Program all access codes prior to turnover to District.

2.08 CONTROL WIRING

A. Connections between the automatic controllers and the electric control valves shall be made with direct burial wire AWG - U.F. No.14-600 volt (use No.12-600v. for all valves farther than 1000 feet from controller). Install in accordance with valve manufacturer's specifications.

1. Waterproof dry-splice connectors shall be 3M #DBY-6 or approved equal.

2. Common wires (use No.12-600v.) shall be white in color with a different color stripe for each controller.

3. Pump start/master valve wires shall be No.12-600v. continuous from controller to pump.

4. Flow sensor wires shall be twisted pair comm. cable as recommended by the flow sensor / controller manufacturers.

2.09 TRACER WIRES

A. No.12 Green Type TW plastic-coated copper tracer wire shall be installed with non-metallic mainlines.

2.10 ELECTRIC CONTROL VALVES

A. All electric control valves shall be as noted on plans and installed per details and manufacturer's specifications. Locate all valves in shrub areas unless otherwise noted.

B. Provide one valve box for each remote control valve.

2.11 BALL VALVES

A. Ball valves shall be as indicated on the drawings and installed per the details and manufacturers recommendations.

2.12 VALVE BOXES

A. Quick Coupler Valves: Carson #0910 (10" round). Locate 12" max. from walks/parallel walks, 3" above grade in shrub areas (top of box flush with top of bark). Use 10" diameter PVC pipe for extension. The cover shall be heat branded with letters QCV, 2” high.

B. Control valves, Ball and Gate valves (≤1-1/2"): Carson #1324 (13"x24"). Locate 12" max. from walks/parallel walks, 3" above grade in shrub areas (top of box flush with top of bark). Install 1" above grade in shrub areas without bark mulch. Install ½” above grade in turf areas (only where specified). Provide and install lock bolt at the end of the maintenance period. The cover shall be heat branded with the valve number, 2” high (for ball and gate valves brand “IRG”).

C. Control valves, Ball and Gate valves (≥2"): Carson #1730 (17"x30"). Locate 12" max. from walks/parallel walks, 2" above grade in shrub areas (top of box flush with top of bark). Install 1" above grade in shrub areas without bark mulch. Install ½” above grade in turf areas (only where specified). Provide and install lock bolt at the end of the maintenance period. The cover shall be heat branded with the valve number, 2” high (for ball and gate valves brand “IRG”).

D. Control Wire Splice Boxes: Carson #1220 (12"x20"). Locate 12" max. from walks/parallel walks, 2" above grade in shrub areas (top of box flush with top of bark). Install 1" above grade in shrub areas without bark mulch. Install ½” above grade in turf areas (only where specified). Provide and install lock bolt at the end of the maintenance period. The cover shall be heat branded with the letters IRG, 2” high.

E. Traffic Area boxes: Concrete box and lid designed for vehicular traffic use. Size to match plastic boxes. Paint concrete lids with 2” high lettering and/or numbers as noted above.

F. Screen for rodent protection shall be 16-gauge galvanized (1/2” x 1/2” openings), placed at base of box extension (above soil and below gravel).

2.13 QUICK COUPLING VALVES

A. Quick coupling valves shall have a brass body with locking cover as indicated on the drawings.

2.14 DRIP EMITTERS

A. Drip Emitters: As specified on drawings or in the irrigation legend.

2.15 PRESSURE REGULATION

A. Pressure regulator shall be as designated on the drawings with output psi as specified.

2.16 SWING CHECK VALVES

A. Swing check valves shall be made of high-impact Sch.40 PVC Type II with reinforced poppet. Install per manufacturer's recommendations.

2.17 SPRING CHECK VALVES

A. Mainline and lateral line spring check valves shall be made of high-impact Sch.40 PVC Type II with reinforced poppet (1/4 lb. spring).

2.18 SOLVENT CEMENT

A. Solvent cement used for bonding rigid PVC pipe and fittings up to 12" size shall be Weld-On #711 as manufactured by IPS Corporation or an approved equal. Primer for Weld-On #711 shall be Weld-On P-70 as manufactured by IPS Corporation or an approved equal.

2.19 MATERIALS TO BE FURNISHED

A. Prior to final inspection furnish the following materials to the District:

1. One key for each five quick coupler valves (one min.) with bronze garden hose bib;
2. Two sets of special tools required for removing, disassembling, and/or adjusting each type of sprinkler and/or valve supplied on the project;
3. As-built drawings;
4. Controller operating manual and colored sectioning chart (for each clock);
5. Two keys for each automatic controller;
6. Two keys for each backflow preventer cover;
7. Pro Max Remote Control Package.

PART 3 - EXECUTION

3.01 SITE CONDITIONS

A. Before starting work on the irrigation system, carefully check all dimensions and grades to determine that work may safely proceed, keeping within the specified material depths.

B. Do not willfully install the irrigation system as indicated on the drawings when it is obvious in the field that unknown obstructions or grade differences exist, that might not have been considered in the engineering. Such obstructions or differences shall be immediately brought to the attention of the Landscape Architect.

C. The installation of all irrigation materials, including pipe shall be coordinated with the landscape drawings to avoid interfering with the trees, shrubs, or other plantings.

D. Layout irrigation heads and make minor adjustments required due to differences between site and drawings. Any such deviations in layout shall be within the intent of the original drawings, and without additional cost to the District. When directed by the Landscape Architect, the layout shall be approved before installation.

E. Manufacturer’s requirements for installation of products shall apply when;

1. No other direction is given;
2. It is a more stringent requirement than the Standard Specifications and these special provisions.

F. Work Space:

1. The Contractor shall erect fences and/or retain guards as required for the protection of the public and construction materials, and maintain same in good repair until the completion of the work under the contract.

G. Drawings of Record

1. Keep record drawings on site daily for observation by the School District Representative. All dimensions shall be taken and recorded prior to backfill. On the date of the final observation, deliver corrected drawings to the School District

Representative. Final drawings shall be prepared by the Contractor on new prints obtained from the School District's Representative, showing all field notes in India ink and finalized by a competent draftsperson. Delivery of prints does not relieve the Contractor of responsibility for providing any information that may have been omitted from the prints.

3.02 PIPE AND CONTROL WIRE INSTALLATION

A. Trenching

1. Dig trenches straight and support pipe continuously on bottom of ditch. Shade pipe in trench to an even grade. Trenching excavation shall follow layout indicated on drawings and as noted. Where lines occur under paved areas, these dimensions shall be considered below subgrade.

2. Provide minimum cover of 18 inches from top of pipe to finish grade for all pressure supply lines.

3. Provide minimum cover of 18 inches from top of pipe to finish grade for all control wires.

4. Provide minimum cover of 12 inches from top of pipe to finish grade for all non-pressure lines.

5. All lines under driveway and roadway pavement shall have a 24-30 inch minimum cover.

B. Cutting and Patching

1. If cutting or breaking of any paving is necessary, it shall be done and replaced with like materials, at the Contractor's expense. Paving work shall match the original work in every respect, including type, strength, texture and finish. Obtain approval from the School District's Representative prior to any cutting and/or breaking. Hydraulic driving will not be permitted under asphalt paving. All sleeves set in place under paving shall extend 18" minimum beyond such paving and be capped hand tight. No fittings, including couplings, will be permitted under surfaces to be paved except where length of the line under the paving exceeds 20-feet and/or where the lines are encased in sleeves.

2. In new paved areas, coordinate installation of piping and wires under paving with the General Contractor.

C. Backfilling

1. Backfill shall not be placed until the installed irrigation system has been inspected, tested, and approved by the Landscape Architect and Project Inspector. Trenches shall be backfilled promptly after the open trench inspection.

2. Backfill for trenching consisting of earth, loam, sandy clay, or other approved materials shall be compacted to a dry density equal to the adjacent undisturbed soil, and shall conform to the adjacent grades without dips, sunken areas, humps or other irregularities. Initial backfill on all lines (bottom 3") shall be of a fine granular material with no foreign matter larger than 1/2 inch size.

3. Irrigation lines under paving shall be backfilled with a 3" sand layer below the pipe and a 3" layer above, compacted in layers to 95% relative density, using

mechanical tamping devices only. The remaining backfill shall be per Section 02200 and the Geotechnical Engineer's recommendations. Compact trenches equal to the compaction of the existing adjacent undisturbed soil and leave in a firm unyielding condition. Leave trenches flush with the adjoining grade.

4. All sand backfill shall terminate 3 feet from end of trench prior to building complex (backfill last 3 feet of all trenches with 50-50 clay/bentonite mix to prevent water migration next to buildings).

D. Water Supply

1. Connections to existing outlets shall be at the approximate location (s) shown on the drawings and indicated by P.O.C. "Point of Connection".

E. Pipe Fittings and Controls

1. Plastic to Plastic Fittings

a. All plastic threaded pipe and fittings shall be assembled using Teflon tape or equivalent, applied to the male threads only.

b. All plastic slip fittings shall be solvent welded as per pipe manufacturer's recommendations. Thoroughly clean PVC pipe and fittings of dirt, dust, and moisture prior to gluing.

c. Slip-fix and/or compression fittings shall not be used to repair line breaks.

2. Plastic to Steel Fittings

a. Male thread plastic into female thread steel shall be used.

b. Work the steel connection first. A non-hardening pipe dope shall be used on threaded plastic-to-metal joints.

3. Galvanized Steel Pipe and Fittings

a. Galvanized pipe threads shall be cut with clean, sharp dies conforming to ASA Specification B-2.

b. Threaded joints shall be made up with the best quality pure joint compound or lead paste (on the male threads only) throughout the system.

c. Any leaky joints shall be remade with new material. Use of thread cement or caulking to make joints tight will not be permitted.

d. Galvanized pipe in contact with the soil shall be wrapped with 20 mil black PVC tape.

F. Line Clearance

1. All lines shall have a minimum clearance of 3 inches from each other, and 12 inches from lines of other trades. Parallel lines shall not be installed directly over one another.

G. Control Wires

1. Wiring shall occupy the same trench and shall be installed along the same route as pressure supply or lateral lines wherever possible. Place wire under water lines.

2. Where more than one (1) wire is placed in a trench, the wiring shall be taped together at intervals of ten (10) feet. Tape to the bottom of the mainline at ten-foot intervals where in common trench. Common and lead wires shall be a different color, with the same color being carried throughout from controller to valve.

3. An expansion curl shall be provided within three (3) feet of each wire connection and at least every one hundred (100) feet in length. Expansion curls shall be formed by wrapping at least five (5) turns of wire around a one-inch pipe (or more) in diameter, then withdrawing pipe.

4. Splices shall be made with 3M waterproof connectors or equal, and done in valve boxes or pull boxes only.

5. Provide one additional wire between the controller and the furthest valve in each direction (north, south, east, and west) as a minimum (4 extra wires possible), unless shown differently on the irrigation plans.

6. If wires under paved areas cannot be continuous, all splices shall be enclosed in an approved box.

7. Tracer wire shall be placed on the bottom of the trench, under the pipe. Wire shall be continuous length throughout the length of the pipe. All splices shall be soldered at joints and covered with exterior wire insulation tape, manufactured for this purpose. Tracer wire shall follow the mainline and branch line and terminate in an irrigation valve box. Provide enough length of wire to reach the surface grade, plus 24”. Bend wire to create a loop and attach an approved label with the designation of “Tracer Wire”.

H. Thrust Blocks

1. All lines larger than 1-1/2" shall receive concrete thrust blocks at all corners, tees, elbows, and end caps. Use a minimum of 1/2 c.f. of concrete per diameter inch of pipe (i.e. 3” pipe = 1.5 c.f. concrete). Do not encase pipe or fittings!

I. Sleeving

1. All lines under paving (concrete and asphalt) shall be sleeved. Sleeves shall be installed in straight runs from planter to planter. Install (pre-pipe) lines in sleeves for future connections at the time of sleeving installation. Sleeves and lines shall extend a minimum of 18” beyond any existing and/or future hardscape.

2. All control wires under paving (concrete and asphalt) shall be sleeved (use sweep ells at all corners). Install a nylon pull cord in sleeving for all wire pulls.

I. Flushing the System

1. After new irrigation pipe lines and risers are in place and connected, all necessary division work has been completed, and prior to installation of sprinkler heads, the control valves shall be opened and a full head of water used to flush

out the system.

3.03 ELECTRIC CONTROL VALVES

A. Install as indicated on the drawings.

B. Install each valve in a separate valve box.

C. When grouped together, allow at least 6 inches between valve boxes.

D. Attach identification tags to each remote control valve, indicating number that corresponds with controller station number.

3.04 DRIP EMITTERS

A. Use hole punch or power drive for emitter holes in polyethylene drip tubing. Prevent penetrating both walls of pipe. Insert barb firmly in pipe until barb completely penetrates one wall of tubing.

3.05 DRIP TUBING

A. Drip tubing shall be installed parallel with elevation contours on slopes where applicable. Install in long, straight runs, continuing over dips and humps, and other minor changes in elevation.

B. Tubing shall be staked 36" on center with 10" long (min.) jute staples.

C. Maximum gallons per minute flow (gpm) through polyethylene tubing shall be as follows: 5/8" = 4 gpm.

Systems shown on the irrigation plans which specify gallonage greater than 4 gpm shall be modified to use larger diameter tubing or manifolded so that each 5/8” lateral does not exceed 4 gpm flow.

3.06 BOOSTER PUMP

A. The booster pump shall be installed 3” above existing grade (on new conc. pad) securely mounted per manufacturer’s recommendations. The protective enclosure shall be lockable. All new wiring and piping shall be subsurface up to the pump system enclosure.

B. The 460-volt electrical supply for the pump shall be provided at the pump location shown on the plans. Subsequent to the mounting of the pump station on the concrete pad, the electrical contractor shall make the final connection to the pump electrical panel.

C. Optional flow start sensing shall be installed as part of the booster pump package.

3.07 ADJUSTING OF SYSTEM

A. Adjust the control valve to obtain the design rated pressure for the system installed.

B. Set all flow-controls on the control valves in the system to the full open position minus 2 turns.

C. If it is determined that adjustments in the irrigation equipment will provide proper and more adequate coverage, make necessary changes without additional cost to District, prior to planting.

D. The entire system shall be operating properly before any planting operations commence.

3.08 EXISTING TREES

A. Where it is necessary to excavate adjacent to existing trees, use all care possible to avoid injury to trees and tree roots. Where root diameter exceeds 2 inches, excavate by hand. Tunnel under roots 2 inches and larger in diameter (wrap root with wet burlap to prevent excessive drying while the trench is open). Where a ditching machine is run close to trees having roots smaller than 2 inches in diameter, hand-trim the wall of the trench adjacent to the tree, making clean cuts through. Paint roots 1 inch and larger in diameter with 2 coats of Tree Seal, or equal. Close trenches adjacent to tree within 24 hours; and where that is not possible, shade the side of the trench adjacent to the tree with burlap or canvas.

3.09 INSPECTION AND TESTING

A. General

1. In no event cover up any work prior to approval of the Landscape Architect. Any work covered prior to inspection shall be opened to view by the Contractor at his expense. Re-examination of questionable work may be ordered by Landscape Architect, and if so ordered, any work must be uncovered by Contractor. If the work is not in accordance with the drawings and specifications, Contractor shall pay the costs of re-examination and replacement.

2. When observations have been conducted by other than the Landscape Architect, submit documentation showing when and by whom these observations were made.

3. No site inspections shall occur without updated record drawings.

4. All observations called for by the Contractor shall be requested in writing at least seven (7) days prior to the anticipated observation.

5. Contractor shall provide “walkie-talkie” equipment and/or personnel to maintain communication from the review area to the automatic controller(s).

6. In the event the Contractor has scheduled an inspection, and the specified work is not completed or deficient, the Contractor shall pay all costs involved for re-examination.

B. Pressure Testing - All mainlines; (and lateral lines under paving)

1. As soon as lines are connected and flushed-out (and prior to attaching valves), cap all outlets and hydrostatically test at 150 psi for a continuous twenty-four (24) hour period, at the end of which the lines and joints shall be inspected by the Landscape Architect and or the Project Inspector (locate pressure gauge at the center of mainline system and shut off water point of connection). The Contractor shall furnish all pumping and test equipment. If leaks develop, the pipe and/or joints shall be replaced and the tests repeated in the presence of the Project Inspector until all leaks are repaired (allowable 5-psi drop in 24-hour period. Pressure must stabilize at max. 5-psi drop).

C. Operation Testing

1. Prior to planting, the entire irrigation system shall be placed in automatic operation and tested in the presence of the Landscape Architect for proper functioning and coverage. If it is determined that adjustments in the irrigation equipment will provide proper and more adequate coverage, make necessary changes without additional cost to District, prior to planting.

3.10 CLEAN UP AND REPAIR

A. Upon completion of the work, make the surface level, remove excess materials, rubbish debris, and remove construction and installation equipment from the premises.

B. Replace and/or repair to the satisfaction of Landscape Architect existing paving disturbed during the course of work. New paving shall be the same type, texture, finish and be equal in every way to the material removed.

3.11 PRE-MAINTENANCE ACCEPTANCE

A. Work under this section will be accepted by the Landscape Architect upon satisfactory completion of all work. Upon pre-maintenance acceptance, the Landscape Architect will give written notification to commence 90-day maintenance period.

3.12 MAINTENANCE

A. The entire irrigation system shall be maintained for a period of 90-days following the date of pre-maintenance acceptance of the work. System shall be in good working order at the end of the maintenance period.

B. Landscape Contractor shall be responsible for any and all damage and/or vandalism to the irrigation system, which may occur during the maintenance period or the course of work (regardless of fault). Make all repairs and provide all replacement materials and labor to the satisfaction of the District.

3.13 FINAL ACCEPTANCE

A. Work under this section will be accepted by the Landscape Architect upon satisfactory completion of all work (including maintenance). Upon final acceptance and written notification, the District will assume responsibility for maintenance of the work.

3.14 GUARANTEE

a. The entire irrigation system shall be guaranteed by the Contractor as to materials and workmanship, including settling of backfilled areas for a period of one (1) year following the date of final acceptance of the work. Guarantee shall also cover damage to any part of the premises resulting from leaks or other defects in, materials, equipment, and workmanship to the satisfaction of the District.

b. A guarantee form shall be re-typed in the following onto the Contractor's letterhead and contain the following information:

"GUARANTEE FOR THE IRRIGATION SYSTEM"

We hereby guarantee that the irrigation system we have furnished and installed is free and clear from defects in materials and workmanship, and the work has been completed in accordance with the Drawings and Specifications. We agree to repair and/or replace all defects in material or workmanship

which may develop during the period of one-year of acceptance and also to repair and/or replace all damages resulting from the repair of such defects at no additional cost to the School District, after receipt of written notice. In the event of our failure to make repairs or replacements within a reasonable amount of time after receipt of written notice, we authorize the School district to proceed to have said repairs and/or replacements made at our expense, and we will pay the costs and charges therefore upon demand.

Project: _____
Location: _____
Contractor/Company: _____
License Number: _____
Address: _____
Office Phone: _____
Cell Phone: _____
FAX: _____
E-mail: _____
Date of Final: _____

Acceptance: _____

Signed: _____ Date: _____

END OF SECTION

SECTION 32 90 00
LANDSCAPE PLANTING

PART 1 - GENERAL

1.01 SCOPE

A. Provide all labor, materials, equipment and services to complete the finish grading, planting, maintenance of planting and related items, as indicated on the drawings and specified herein, providing landscaping with plants in vigorous growth condition, ready for the Owner's use.

B. Related work specified elsewhere includes but may not be limited to:

1. Landscape Irrigation – Section 32 80 00.
2. Turf Hydroseeding – Section 32 92 16.

1.02 SUBMITTALS

A. Furnish original material invoices and original truck delivery tickets indicating the quantities of fertilizers and soil amendments delivered to the job site. Material invoices must be approved by the Landscape Architect prior to installation. Photocopies will not be accepted and the Landscape Architect must be on site to verify all deliveries.

B. Furnish material invoices or documentation to the Landscape Architect at least 30 days prior to start of work indicating that all plant material has been ordered.

1.03 PROTECTION

A. Contractor shall check for location of cables or conduits, utility lines and other existing features or conditions above or below ground level that might be damaged as a result of his/her operation. Questions or conflicts arising out of such examination prior to or during operation shall be immediately directed to the attention of the Landscape Architect for necessary action or decisions before resuming operation. Contractor shall be responsible for repair or replacement, at no cost to the Owner, for features or conditions damaged through failure to comply with above procedures.

1.04 ALTERNATES

A. Alternates will not be permitted unless authorized by the Landscape Architect at least 30 days prior to start of work. The Landscape Architect will assist the Contractor in the selection of the nearest equivalent size and variety of plant.

1.05 DRAWINGS

A. Interpretations: Drawings and specifications are intended to be fully cooperative and to agree. However, if the Contractor observes that the drawings and specifications are in conflict, (s)he shall promptly notify the Landscape Architect in writing (prior to bidding and/or construction). The specification calling for any higher quality material or workmanship shall prevail. Questions regarding interpretation of drawings and specifications shall be clarified by the Landscape Architect.

1.06 INSPECTIONS

A. The Contractor shall notify the Landscape Architect 24 hours in advance of all soil preparation, planting and maintenance inspections.

B. The Contractor shall schedule with the Landscape Architect a preconstruction conference at least 7 days before beginning work under this section. Purpose of this conference will include:

1. Review of Contractor's questions regarding this project;
2. Review administrative and inspection procedures that will occur during construction;
3. Review the Contractor's work schedule for this project;
4. Verification of Contractor's C-27 License, Bonding and Insurance.

C. Fine Grading and Soil Preparation

1. Furnish certificates for soil amendments at this time (per Section 1.02);
2. The fine grading and soil preparation of all planted areas must be approved prior to installation of plant material.

D. Plant Material

1. Plant material quality will be inspected prior to planting. Plants that are found to be rootbound, of insufficient size, or of irregular shape may be rejected by the Landscape Architect. Rejected plants will be replaced at no extra expense to the Owner.

2. The Contractor will field locate all box and container stock before planting. The Landscape Architect will then be allowed to adjust the locations of any plant materials prior to installation.

E. Pre-Maintenance Inspection

1. The pre-maintenance inspection will occur after all work has been completed as indicated on the drawings and in the specifications. If approved, this will be the starting date of the 90 day maintenance period.

F. Final Inspection

1. The final inspection will occur after the 90 day maintenance period and all work is completed. If approved, this will be the date of final acceptance.

1.07 GUARANTEE AND REPLACEMENT

A. All specimen trees in 24 inch box and larger shall be guaranteed for one (1) full year; all 15 gallon plants for one (1) year; all 1 gallon and 5 gallon plants for six (6) months; lawns for three (3) months; 4” or 5½” pot and flatted groundcover for 60 days, from date of final acceptance.

B. The Contractor shall replace all dead plants and all plants not in a vigorous, thriving condition as determined by the Landscape Architect during and at the end of the guarantee period. Replacement plants shall be of the same quality as the original specified plants.

C. Landscape Contractor shall be responsible for any and all damage and/or vandalism to planting which may occur during the maintenance period or the course of work (regardless of fault). Make all repairs and provide all replacement materials and labor to the satisfaction of the Owner.

PART 2 - MATERIALS

2.01 PLANT MATERIAL

A. Plants shall be grown in nurseries inspected by the State Department of Agriculture. Plants shall be grown in accordance with good horticultural practices under climatic conditions similar to those of the project.

B. Plants shall be fresh, well-established, vigorous, of normal habit of growth, free of disease, insects, insect eggs and larvae. Plants shall be healthy, with a normal root system, well filling their containers, but not to the point of being rootbound.

C. The height and spread of all plant material shall be measured with branches in their normal position when plant is installed. Multitrunked trees, as noted on the drawings, shall mean trees with three or more trunks and all trunks shall be equal in caliper. All multitrunked trees shall be true multis. Made up multis where 3 separate plants are grown together are not acceptable.

D. Pruning shall not be done prior to inspection.

E. The size of plants shall conform to the plan or the plant list. Oversized plants may be used at no additional cost to the Owner. Plants shall be well rooted in their containers. Rootbound plants and plants with poorly formed root systems, as a result of a recent shift in container size, will not be accepted.

F. Tree trunk calipers and taper shall be sufficient so that the tree will remain vertical without a stake. Trunk caliper at 6 inches above the soil media (substrate) surface shall be within the diameter range shown for each container size below:

Container Size	Trunk Diameter
5 gal	0.5" to 0.75"
15 gal	0.75" to 1.5"
24-inch box	1.5" to 2.5"

2.02 TOPSOIL

A. Topsoil shall be fertile, friable, sandy loam free from weeds and seeds per USDA 7th approximation classification method. Acceptable soil from the site may be used. Should topsoil be imported, an agricultural suitability test shall be conducted by an approved soils laboratory and results submitted to the Landscape Architect for approval prior to delivery to job site.

B. Identify source location, percentages of silt, clay, sand, organic matter, pH, mineral and plant nutrient content of soil. Particle size shall fall within the following desired range:

Clay and silt, 20% - 50%; fine sand, 30% - 40%; coarse sand, 5% - 20%; gravel (maximum aggregate size 3/4"), 0% - 8%; decomposed organic matter, 2% - 50%. All sandy loam must pass through a one inch sieve. The sand fraction shall have 85% falling within the medium to fine sand range. Soils unsuitable for planting shall be rejected.

C. Provide soils analysis expressed in parts per million including the following:

Organic content; nitrogen; phosphorous; potassium; magnesium; calcium; sodium; sulfur; zinc; manganese; copper; iron; boron; pH; ammonium; sodium absorption rate (SAR); ECe; and USDA particle size.

D. Suitability of soil and chemical deficiencies will be determined by Landscape Architect (Landscape Architect may submit a list of what additives should be installed to correct these problems). Soils deemed unsuitable for planting shall be rejected.

2.03 SOIL AMENDMENT

A. Pre-plant fertilizer shall consist of Gro-Power Plus 5-3-1 Humus Base Fertilizer & Soil Conditioner. Retain all bags for inspection by Landscape Architect prior to disposal.

B. Top-dress fertilizer shall consist of Gro-Power Premium Hi-Nitrogen 18-3-7 on turf areas; Gro-Power All Purpose 5-3-1 Fertilizer on flatted groundcover areas; Flower 'N' Bloom 3-12-12 Fertilizer on 4" or 5½" pot areas. Retain all bags for inspection by Landscape Architect prior to disposal.

C. Tree and shrub fertilizer shall consist of Best "Best-Paks" 20-10-5 fertilizer packets, used with the backfill of every plant as follows:

1. 4" or 5½" pot - 1 packet;
2. 1 gallon - 1 packet;
3. 5 gallon - 3 packets;
4. 15 gallon - 9 packets;
5. Box plants - 1 packet per every 2" of box size.

D. Organic amendment shall consist of nitrolized redwood sawdust. Submit sample and analysis to Landscape Architect for approval prior to delivery to site.

1. Nitrogen stabilized: .4 - .6% N (dry weight for redwood sawdust), .56 - .84% N (dry weight for fir or cedar), .8 - 1.2% N (dry weight for fir or pine).

2. Particle size: 95 - 100% passing 6.35mm standard sieve, 80 - 100% passing 2.33mm standard sieve.

3. Salinity: Saturation extract conductivity shall not exceed 3.5 millimhos/centimeter at 25 degrees centigrade.

E. Gypsum shall be powdered calcium sulfate (clay soils only).

2.04 MIXES

A. Backfill mix for each plant shall consist of 6 parts native soil (or approved imported soil), 4 parts nitrolized organic amendment, Gro-Power Plus 5-3-1 fertilizer (18 lbs./c.y. fill), Agricultural Gypsum (15 lbs./c.y. fill), and "Best-Paks" fertilizer packets as noted.

2.05 MULCH

A. Shrub Area / Planter Mulch: 100% Redwood/Fir walk-on bark (shredded to ¼" to ½" dia. size), free of sticks, dirt, dust or other debris (KEEP 2" MINIMUM FROM STEM/TRUNK OF PLANT). Note: Recycled material will not be accepted.

2.06 HERBICIDE

A. Post-emergence (existing weeds): "Roundup" or equal/approved.

B. Pre-emergence (non-turf areas only, prior to seed germination): "Ronstar" or equal/approved.

C. Post-emergence (turf areas only): "Ortho Weed-B-Gon" or equal/approved.

2.07 DEEP ROOT PLANTERS

A. All trees planted within 7 feet of paving or curbing, or in tree wells, shall have deep root planters.

B. Deep root planters shall be Deep Root Corporation Model “UB 18-2” for 15 gallon trees, Model “UB 24-2” for 24” box trees, Model “UB 36-2” for 36” box trees or equivalent (high-density polyethylene). Install per manufacturer’s instructions.

2.08 TREE GRATES

A. All trees where specified on the plans shall receive tree grates.

B. Tree grates shall as specified on plans.

C. Install per manufacturer’s instructions.

2.09 GOPHER PROTECTIVE CAGING

A. All container stock planting where specified shall include protective caging.

B. Wire for caging shall be 16 gauge galvanized "chicken wire".

PART 3 EXECUTION

3.01 SOIL PREPARATION

A. Remove from all planted areas rocks over 1 inch diameter, sticks and other debris, weeds and foreign growth of any kind.

B. In the event actively growing common bermuda grass or bermuda stolens are encountered, an "irrigation - germination - weed eradication" program shall be performed until all non-specified plant material has been removed. Upon acceptance of irrigation system by the Landscape Architect, Contractor shall apply sufficient amounts of irrigation water to initiate germination of any and/or all non-specified seeds. The "irrigation - germination - weed eradication" program shall be performed a minimum of two (2) times or until all non-specified plant material has been removed.

C. Contractor shall chemically eradicate all germinated weed seeds. (See Section 2.06 Herbicide A. Post-emergence.)

D. To all planted areas apply the following per 1000 s.f. and till into the top 6" of soil:

1. 200 lbs. Gro-Power Plus 5-3-1 Fertilizer;
2. 3 cubic yards of organic amendment;
3. 200 lbs. Gypsum (clay soil only).

3.02 FINISH (FINE) GRADING

A. No plant materials shall be installed until all operations in conjunction with the installation of the irrigation system have been completed, finish grades have been established and planting areas have been properly prepared and graded.

B. Finish grading operations shall include establishment and/or re-establishment of all surface drainage patterns, as indicated on the grading and drainage plans. All areas shall have a uniform gradient, with no abrupt changes and/or undulations. All low-spots shall be filled to establish positive drainage to appropriate drainage facilities.

C. Finish grade includes, but is not limited to, the removal of all foreign material of any kind, 1” and larger, within the top 6” of the soil surface.

D. Establish finish grade for sodded turf areas 1½” (hydroseeded turf areas 1”) below header board, edging, mow strips and/or adjacent pavement areas.

E. Establish finish grade for planting areas 3” below header board, edging, mow strips and/or adjacent pavement in areas to receive minimum 2” layer of mulch.

F. Establish finish grade for planting areas 1” below header board, edging, mow strips and/or adjacent pavement in 4” or 5½” pot and flatted groundcover areas to receive minimum 1” layer of mulch.

G. All areas shall be compacted with a water-filled roller to provide a smooth finish surface. Final compaction shall range between 85% for level areas, and up to 90% for 2:1 slopes.

H. All finish grades shall be completed and accepted by the Landscape Architect prior to any planting and/or hydroseeding or turf sodding operations.

3.03 PLANTING - TREES AND SHRUBS

A. Trees and shrubs shall be set in the field in locations shown on the drawings. All planting locations shall be approved or adjusted as necessary by the Landscape Architect before planting holes are excavated.

B. Tree and shrub planting shall comply with details on the plan.

C. Excavate pits of circular outline with vertical sides for all plants. Scarify sides and bottoms of all plant pits.

D. After removing plant from container, make several 1" deep vertical cuts along the root ball to scarify it to prevent root bound conditions. Protect roots or balls of plants at all times from sun and drying winds.

E. Use backfill mix to backfill plant pits (thoroughly mix prior to use). Set plants plumb and brace rigidly in position until planting soil has been tamped solidly around the ball and roots. When plant pits have been backfilled approximately 2/3 full, water thoroughly, saturating rootball, before installing remainder of the planting soil to top of pit, eliminating all air pockets.

F. Place “Best-Paks” fertilizer packets evenly distributed in plant pits when backfilled 2/3 according to the schedule specified.

G. Stake plants in accordance with the details on the plans. Stakes shall not interfere with the root ball area. Stake immediately after planting. Plants shall be plumb after staking. Stakes and ties shall be adjusted to prevent girdling and chafing and shall be removed as soon as trees show signs of inherent stability.

H. If directed by the Landscape Architect, the Contractor shall prune plants in accordance with standard horticultural practice. Cuts over ½" in diameter shall be painted with approved tree paint.

I. Form water wells around tree and shrub pits according to details on plans. NOTE: *Do not form basins in turf areas*.

J. Mulch all water wells with a 3" layer of specified mulch.

3.04 PLANTING – FLATTED GROUNDCOVER, 4” AND 5½” POTS

A. All plants shall be well rooted and shall be evenly spaced distances as indicated on the drawings and shall be staggered in rows.

B. Dig good sized pockets for planting so that the root system lies free without doubling and so that roots are planted vertically, not horizontally.

3.05 MAINTENANCE AND PROTECTION OF EXISTING TREES AND SHRUBS TO REMAIN

A. General: Conform to all applicable specifications regarding pruning, watering, spraying and fertilizing of new vegetation as specified in this section. All existing trees and shrubs are to be continually watered and maintained throughout the construction period. *The condition of all plant materials to remain shall be assessed by Landscape Architect after construction.*

B. The soil and grade under the dripline of the existing trees shall not be altered during development. Autos, trucks and machinery shall not be parked, driven or stored under the trees during the development phase. A temporary barrier shall be placed around the trees at the edge of the canopy until construction is completed.

C. Trenching inside the dripline or within the root zone (five feet from the dripline) shall be avoided if possible. If trenching is necessary, all utilities should be placed within one trench.

1. Prior to trenching the root zone the affected trees shall be thoroughly irrigated the length of the trench.

2. Trenching shall be by auguring or by hand trenching. Roots over one inch in diameter shall be preserved if at all possible. These roots shall not be ripped but cleanly cut along the sides of the trench.

3. All excavated soil shall be replaced and tapped down in the trench so that so that no fill remains under the dripline of the tree and the grade is restored to its predisturbance condition.

4. After the trench is filled, the area under the tree’s dripline shall be irrigated so that water penetrates to the depth of the trench bottom.

5. Significant drainage changes around existing trees shall be corrected if grade changes occur during construction or if a retaining wall is constructed within the root zone of the tree.

D. Be alert to symptoms of construction damage to root systems of existing trees as evidenced by wilting, unseasonal loss of leaves, and insect or disease infestation due to declining vigor.

E. Notify the Owner's representative in writing of all evidence of declining tree vigor immediately upon discerning the problem. Take appropriate interim measures to mitigate the severity of the problem as specified in this section.

F. Submit a written proposal and cost estimate for the correction of all conditions before proceeding with the permanent correction work.

3.06 WEED CONTROL

A. Keep all planting areas, including areas to receive sodding or hydroseeding, free from weeds at all times. Contractor shall be responsible for weed control throughout the installation period and prior to the pre-maintenance acceptance.

B. After planting is completed, a pre-emergence herbicide shall be applied to all shrub, 4" or 5½" pot and groundcover areas. Water to a depth of ¼". Do not apply to seeded areas, or areas to receive sod.

3.07 CLEAN-UP

A. Keep all areas of work clean, neat and orderly at all times. Keep all paved areas clean during planting and maintenance operations. Clean up and remove all deleterious materials and debris from the entire work area prior to final acceptance to the satisfaction of the Landscape Architect.

B. Comply with all applicable storm water pollution prevention plans.

3.08 PRE-MAINTENANCE ACCEPTANCE

A. Work under this section will be accepted by the Landscape Architect upon satisfactory completion of all work. Upon pre-maintenance acceptance, the Landscape Architect will give written notification to commence 90 day maintenance period.

3.09 MAINTENANCE

A. After all work indicated on the drawings and specifications has been completed, inspected and approved by the Landscape Architect, the maintenance period shall begin. The Contractor shall maintain all planted areas by means of continuous watering, weeding, mowing, re-seeding, cultivation, spraying, mulching, pruning, edging and/or any other operation necessary for their care and upkeep for the period of ninety (90) calendar days.

B. All areas shall be kept weed free during the maintenance period. Groundcover, 4" or 5½" pot and shrub areas shall be cultivated regularly to maintain a loose, attractive soil.

C. The Contractor shall immediately replace any and all plant materials, which, for any reason, die or are damaged while under his care. Replacement plants shall be of the same quality as the original specified plants.

D. Damage to planting areas shall be repaired immediately. Any settling of the soil shall be repaired, design grades re-established and areas replanted. Depressions caused by foot traffic will be filled with soil and leveled.

E. Top-dress fertilizer shall be applied at 8 pounds per 1000 s.f. to all hydroseeded turf and flatted groundcover areas; 2 pounds per 100 s.f. to 4” or 5½” pot areas, at 30 and 45 days after the maintenance period is started (provide invoices and delivery tickets). NOTE: *Wash all fertilizer material from leaves.*

F. To all shrub, 4” or 5½” pot and groundcover areas apply a pre-emergence spray or granular application at the start and end of the maintenance period.

G. At completion of the maintenance period, all areas included in this contract shall be clean and free of debris and weeds, all plant materials shall be live, healthy and free of infestation.

H. Turf areas shall be mowed at least once during maintenance period. No grass or weed growth shall be allowed to exceed 3" in height and shall be cut back each time to 1½" in height. Spot cutting shall also be done so that no part exceeds 3" in height at any time. All clippings and debris shall be removed (at contractor’s expense) and disposed of off-site in a legal manner.

I. To all turf areas apply a broad-leaf herbicide after three mowings. If weeds reappear, a second application shall be required prior to the end of the maintenance period.

3.10 FINAL ACCEPTANCE

A. Work under this section will be accepted by the Landscape Architect upon satisfactory completion of all work (including maintenance). Upon final acceptance, and written notification, the Owner will assume responsibility for maintenance of the work.

END OF SECTION

SECTION 32 92 16
HYDROSEEDING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:

1. All labor, materials, tools and the transportation and the performance of all the work required as indicated on the drawings and specifications, and reasonably incidental to:

   a. Furnish all plant material;
   b. Preparation and seeding of hydroseeded areas;
   c. Clean up;
   d. Establishment period;
   e. Guarantee.

B. Requirements

1. Obstructions to landscaping operations: If rock, plaster, concrete debris, electrical cables, conduits or utility lines are encountered and cause conflict with landscaping operations, notify the Landscape Architect immediately.

2. Guarantees: The Contractor shall repair or replace any or all of the work, together with any other adjacent work which may be displaced by so doing, that may prove to be defective in its workmanship or material for the period of 120 days for all hydroseeded areas from the end of the maintenance period.

PART 2 - PRODUCTS

2.01 HYDROSEED MIX – EROSION CONTROL MIXTURE

A. All hydroseed mixes shall consist of the following (in lbs./acre):

2000 lbs. - Wood Fiber Mulch (green in color)
900 lbs. - Gro-Power Humus Base Fertilizer 5-3-1
400 lbs. - Gro-Power Controlled Release Fertilizer 12-8-8
100 lbs. - R2400-400CL Tackifier

Seed Mix #1 (non-irrigated, in lbs./acre):		Minimum P.L.S.*
51 lbs.	- Coastal Sage Scrub Mix (from S&S Seeds)	
20 lbs.	Regreen™	N/A
71 lbs.	TOTAL	

Seed Mix #2 (non-irrigated, in lbs./acre):		Minimum P.L.S.*
50 lbs.	- Regreen™	N/A

*P.L.S. = Pure Live Seed

B. Deliver total seed requirements in unmixed, unopened bags to the site prior to seeding, with the producer's certificates attached showing purity/germination rates and weed content.

C. Supply Landscape Architect with seed test reports from a certified testing laboratory showing purity/germination rates and weed content 30 days prior to seeding.

D. All seed certificates are to be detached by the Landscape Architect and retained for permanent records. Landscape Architect may take samples of all specified seed for testing purposes, if testing is deemed necessary at a future date.

E. Seed mix shall contain no noxious weed species. Seed will be rejected if it is found to be wet, moldy, or damaged, or if weed content exceeds 0.5% by weight.

PART 3 - EXECUTION

3.01 COMBINATION OF MATERIALS

A. Mixing shall be performed in a tank, with a continuous agitation system of sufficient operating capacity to produce a homogeneous slurry of fiber, seed, fertilizer, humectant, tackifier and water in the designated unit proportion.

B. With the agitation system operation at part speed, water shall be added to the tank.

C. The seed shall be added first; then fertilizer shall be added, and then the fiber. If a centrifugal pump and recirculation is employed, fiber is added before seed.

D. The fiber shall not be added until the tank is at least one-third filled with water.

E. The mixture shall be agitated at full speed when the tank is half-filled with water.

F. All fiber shall be added by the time the tank is two-thirds to three-fourths full.

G. Maximum permissible time of mix of fertilizer and seed shall be one hour in order to prevent deterioration of seed.

3.02 HYDROSEEDED AREAS

A. The areas to be hydroseeded are as shown on the drawings.

B. Soil surface in the areas to be hydroseeded shall be loose, friable and roughened to a depth of 2" so that seed will remain in place prior to seeding.

C. Seed mix shall be uniformly seeded at rates specified in Section 2.00 - 2.01 and/or plan.

D. Seed mix shall be applied prior to November 15 to take advantage of seasonal rainfall.

3.03 WEED CONTROL

A. Subsequent to seed germination (and throughout the maintenance period) Contractor shall mechanically and/or chemically eradicate all weeds as soon as they can be identified.

B. Remove all weeds from site before they set seed.

3.04 GUARANTEE

A. All seeded areas shall be 100% established by the end of the maintenance period. Final acceptance will be postponed (maintenance period will be extended) until 100% establishment is achieved or approved by Owner.

END OF SECTION