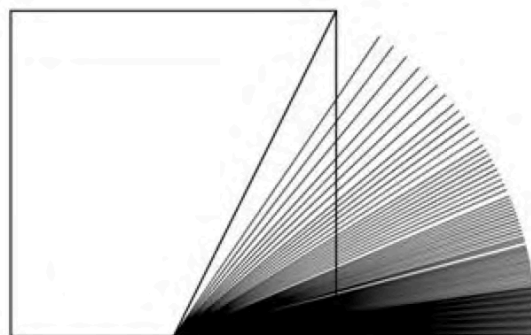

PROJECT MANUAL FOR

**BRAZOS TRANSIT DISTRICT
COORDINATION COMPLEX CENTER**
Referencing the Contract Documents Titled
BRAZOS TRANSIT DISTRICT NEW COORDINATION COMPLEX
TDLR #: TABS2019018724

BRYAN, TEXAS
AUGUST 20, 2019

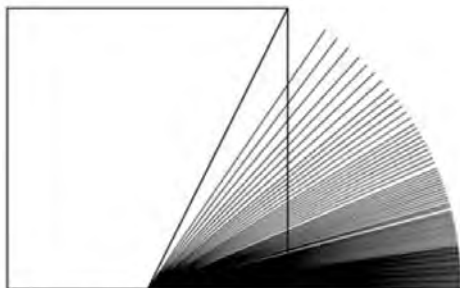


**WILLIAMSON GROUP
ARCHITECTS**

ARCHITECTURE PLANNING INTERIORS

106 EAST 26th STREET, BRYAN, TEXAS 77803

PROJECT MANUAL
FOR
BRAZOS TRANSIT
DISTRICT
COORDINATION
COMPLEX CENTER
AUGUST 20, 2019



**WILLIAMSON GROUP
ARCHITECTS**
ARCHITECTURE PLANNING INTERIORS
106 EAST 26th STREET, BRYAN, TEXAS 77803

BRAZOS TRANSIT DISTRICT
1759 N. EARL RUDDER FWY
BRYAN, TEXAS 77803

WILLIAMSON GROUP ARCHITECTS
106 E. 26TH ST.
BRYAN, TEXAS 77803

**PLANNORTH
ARCHITECTURAL CO.**
P.O. BOX 2468,
BRENHAM, TEXAS 77834
PH. 979-421-8003

CIVIL ENGINEER
GESSNER ENGINEERING
2501 ASHFORD DRIVE,
COLLEGE STATION, TEXAS 77840
PH. 979-680-8840

STRUCTURAL ENGINEER
GESSNER ENGINEERING
2501 ASHFORD DRIVE,
COLLEGE STATION, TEXAS 77840
PH. 979-680-8840

MEP ENGINEER
LEE, TRUONG & YU ENGINEERS,
PLLC.
16225 PARK TEN PLACE, SUITE 810,
HOUSTON, TEXAS 77084
PH. 281-945-8888

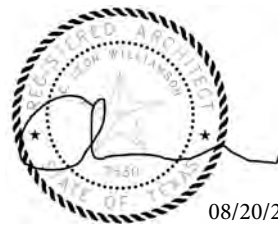


TABLE OF CONTENTS

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44

00 00 00 **PROCUREMENT AND CONTRACTING REQUIREMENTS**

00 10 00 **Solicitation**

00 11 19 Request for Proposal.....1-43

00 30 00 **Available Information**

00 31 00 Available Project Information1

00 40 00 **Procurement Forms and Supplements**

00 41 23 Proposal/Bid Form1-4

00 50 00 **Contracting Forms and Supplements**

00 52 00 Indemnity and Hold Harmless Agreement1-2

00 70 00 **Conditions of the Contract**

00 73 00 Supplementary Conditions AIA 1997 1-10

01 00 00 **GENERAL REQUIREMENTS**

01 10 00 **Summary**

01 11 00 Summary of Work.....1-2

01 14 00 Contractor Site Rules.....1

01 20 00 **Price and Payment Procedures**

01 21 00 Allowances1-2

01 23 00 Alternates and Unit Prices.....1-3

01 29 73 Schedule of Values.....1

01 30 00 **Administrative Requirements**

01 31 19 Project Meetings1-4

01 31 23 Project Website1

01 32 16 Construction Schedule1

01 32 29 Notification of Architect Requirements1-2

01 33 00 Submittals1-7

01 40 00 **Quality Requirements**

01 42 13 Abbreviations and Symbols1-4

01 45 23 Testing Services and Observations1-7

01 70 00 **Execution and Closeout Requirements**

01 78 00 Guarantees and Certificates and Close-Out1-2

02 00 00 **EXISTING CONDITIONS**

02 06 14 Geotechnical Report.....1

02 40 00 **Demolition**

02 41 19 Selective Demolition.....1-2

1	04 00 00	<u>MASONRY</u>	
2	04 20 00	Unit Masonry	
3	04 20 00	Unit Masonry	1-9
4	04 70 00	Manufactured Masonry	
5	04 72 00	Cast Stone Masonry.....	1-3
6			
7	05 00 00	<u>METALS</u>	
8			
9	05 10 00	Structural Metal Framing	
10	05 12 00	Light Gauge Steel Framing	1-4
11	05 50 00	Metal Fabrications	
12	05 55 00	Metal Fabrications	1-4
13			
14	06 00 00	<u>WOOD, PLASTICS, AND COMPOSITES</u>	
15			
16	06 10 00	Rough Carpentry	
17	06 10 00	Rough Carpentry – ACQ Treated	1-3
18	06 18 00	Glue Laminated Timbers	1-2
19	06 20 00	Finish Carpentry	
20	06 22 00	Finish Carpentry and Millwork	1-4
21			
22	07 00 00	<u>THERMAL AND MOISTURE PROTECTION</u>	
23			
24	07 10 00	Dampproofing and Waterproofing	
25	07 10 01	Dampproofing & Thru-Wall Flashing	1-4
26	07 20 00	Thermal Protection	
27	07 21 13	Building Insulation	1-3
28	07 40 00	Roofing and Siding Panels	
29	07 42 00	Metal Wall Panels	1-3
30	07 50 00	Membrane Roofing	
31	07 54 23	Thermoplastic Single Ply Membrane Roofing.....	1-8
32	07 60 00	Flashing and Sheet Metal	
33	07 62 00	Flashing and Sheetmetal - Pre-Finished.....	1-6
34			
35	07 80 00	Fire and Smoke Protection	
36	07 84 13	Penetration Firestopping, Seals.....	1-4
37	07 90 00	Joint Protection	
38	07 90 00	Building Sealants	1-2
39			
40	08 00 00	<u>OPENINGS</u>	
41			
42	08 10 00	Doors and Frames	
43	08 11 13	Hollow Metal Doors and Frames	1-5
44	08 14 23.16	Plastic Laminate Faced Wood Doors	1-3

1	08 40 00	Entrances, Storefronts, and Curtain Walls	
2	08 41 13	Glazed Systems	1-7
3	08 70 00	Hardware	
4	08 71 00	Finish Hardware	1-14
5			
6	09 00 00	<u>FINISHES</u>	
7			
8	09 20 00	Plaster and Gypsum Board	
9	09 28 16	Gypsum Board Systems	1-5
10	09 30 00	Tiling	
11	09 30 13	Ceramic Tiling.....	1-4
12	09 50 00	Ceilings	
13	09 50 00	Wood Panel Ceilings	1-7
14	09 51 00	Acoustical Lay In Ceiling	1-4
15	09 54 23	Linear Metal Ceilings	1-3
16	09 60 00	Flooring	
17	09 61 19	Concrete Floor Sealer	1
18	09 64 53	Luxury Vinyl Tile Flooring	1-3
19	09 68 00	Carpet	1-3
20	09 70 00	Wall Finishes	
21	09 78 00	Wall Panel Systems, Plastic Laminate.....	1-2
22	09 90 00	Painting and Coating	
23	09 90 00	Painting and Staining.....	1-6
24			
25	10 00 00	<u>SPECIALTIES</u>	
26			
27	10 00 00	Miscellaneous Specialties.....	1
28	10 10 00	Information Specialties	
29	10 14 00	Graphics	1-2
30	10 20 00	Interior Specialties	
31	10 26 13	Corner Guards.....	1
32	10 28 13	Toilet Room Accessories	1-3
33	10 40 00	Safety Specialties	
34	10 44 00	Fire Extinguisher and Cabinets	1-2
35	10 70 00	Exterior Specialties	
36	10 73 16	Aluminum Canopy (Trellis).....	1-2
37	10 75 00	Aluminum Flagpoles	1-2
38			
39	12 00 00	<u>FURNISHINGS</u>	
40			
41	12 20 00	Window Treatments	
42	12 21 14	Roller Shades	1-7
43	12 30 00	Casework	
44	12 36 40	Stone Countertops	1-

1	28 00 00	<u>ELECTRONIC SAFETY AND SECURITY</u>	
2	28 00 00	Access Control	1-24
3			
4	31 00 00	<u>EARTHWORK</u>	
5			
6	31 30 00	Earthwork Methods	
7	31 31 16	Termite Control.....	1-2
8			
9	32 00 00	<u>EXTERIOR IMPROVEMENTS</u>	
10			
11	32 30 00	Site Improvements	
12	32 31 19	Ornamental Metal Fence.....	1-3
13	32 80 00	Irrigation	
14	32 84 00	Irrigation	1-4
15	32 90 00	Planting	
16	32 92 13	Hydro Mulch Seeding	1-4
17	32 92 23	Sodding	1-4
18	32 94 00	Landscaping	1-5

19

20 **INDEX OF DRAWINGS**

21			
22	<u>SHEET NO.</u>	<u>SHEET NAME</u>	
23	ARCHITECTURAL DRAWINGS		
24			
25	G1.01	PROJECT DATA	
26	G1.02	ADA AND TAS STANDARDS - FOR REF. ONLY	
27	G1.03	ADA AND TAS STANDARDS - FOR REF. ONLY	
28	G1.04	ADA AND TAS STANDARDS - FOR REF. ONLY	
29	G1.05	ADA AND TAS STANDARDS - FOR REF. ONLY	
30	G1.06	ADA AND TAS STANDARDS - FOR REF. ONLY	
31			
32	CIVIL DRAWINGS		
33			
34	C000	NOTES	
35	C100	SITE PLAN	
36	C101	FIRE PLAN	
37	C200	DEMO PLAN	
38	C300	DIMENSION PLAN	
39	C400	PAVING AND JOINT PLAN	
40	C500	GRADING PLAN	
41	C600	DAM	
42	C604	STORM PLAN	
43	C700	UTILITY PLAN	
44	C800	EROSION CONTROL	
45	C900	CIVIL DETAILS	

1		
2	CIVIL DRAWINGS	
3		
4	C1	CONTECH
5	C5	CONTECH
6		
7	CIVIL DRAWINGS	
8		
9	S1	CITY OF BRYAN STANDARD SEWER DETAILS
10	S2	CITY OF BRYAN STANDARD SEWER DETAILS
11	W1	CITY OF BRYAN STANDARD WATER DETAILS
12	W2	CITY OF BRYAN STANDARD WATER DETAILS
13		
14	STRUCTURAL DRAWINGS	
15		
16	S000	NOTES
17	S100	DIMENSION CONTROL PLAN
18	S101	FOUNDATION PLAN
19	S102	CLERSTORY FRAMING PLAN
20	S104	ROOF PLAN
21	S200	BRACED FRAME ELEVATIONS
22	S300	SECTION
23	S400	SITE COMPONENTS
24	S500	FOUNDATION DETAILS
25	S501	FOUNDATION DETAILS
26	S510	FRAMING DETAILS
27		
28	ARCHITECTURAL DRAWINGS	
29		
30	A1.01	OVERALL SITE PLAN
31	A1.02	ARCHITECTURAL SITE PLAN
32	A1.03	LANDSCAPE PLAN
33	A2.01	DIMENSIONED FLOOR PLAN
34	A2.02	ANNOTATED FLOOR PLAN & PLAN DETAILS
35	A2.03	FURNITURE & EQUIPMENT PLAN
36	A3.01	PARTITION TYPES
37	A3.02	PARTITION TYPES & PLAN DETAILS
38	A3.03	PLAN DETAILS
39	A4.01	ROOF PLAN & ROOF DETAILS
40	A5.01	ENLARGED PLANS & INTERIOR SIGNAGE
41	A6.01	BUILDING SECTIONS
42	A6.02	WALL SECTIONS & SECTION DETAILS
43	A6.03	WALL SECTIONS & SECTION DETAILS
44	A6.04	WALL SECTIONS
45	A6.05	SECTION DETAILS
46	A7.01	EXTERIOR ELEVATIONS
47	A8.01	INTERIOR ELEVATIONS
48	A8.02	INTERIOR ELEVATIONS

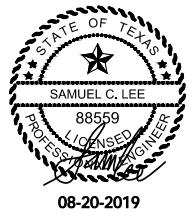
1	A8.03	MILLWORK DETAILS
2	A8.04	MILLWORK DETAILS
3	A8.05	MILLWORK DETAILS
4	A9.01	DOOR TYPES AND FRAME ELEVATIONS/ SCHEDULE
5	A9.02	FRAME ELEVATIONS
6		
7		FRAME ELEVATIONS
8		
9	A9.03	FRAME DETAILS
10	A9.04	FRAME DETAILS
11	A9.05	DOOR HARDWARE SCHEDULE
12	A10.01	REFLECTED CEILING PLAN
13	A10.02	CEILING DETAILS
14	A11.01	ROOM FINISH SCHEDULE, FLOOR FINISH PLAN AND SCHEDULE
15	A11.02	WALL FINISH PLAN, WALL FINISH SCHEDULE AND NOTES
16		
17		MECHANICAL DRAWINGS
18		
19	M101	MECHANICAL FLOOR PLAN
20	M102	MECHANICAL PIPING PLAN
21	M201	MECHANICAL SCHEMATICS
22	M301	MECHANICAL SCHEDULES
23	M401	MECHANICAL DETAILS
24		
25		ELECTRICAL DRAWINGS
26		
27	E100	ELECTRICAL SITE PLAN
28	E100-A	ELECTRICAL DATA CONDUIT ROUTE
29	E100-B	ELECTRICAL SITE PLAN SHEET
30	E101	ELECTRICAL POWER FLOOR PLANS
31	E201	ELECTRICAL LIGHTING FLOOR PLANS
32	E500	ELECTRICAL SINGLE LINE DIAGRAM
33	E501	ELECTRICAL SINGLE LINE DIAGRAM
34	E502	PANEL SCHEDULES
35	E503	PANEL SCHEDULES
36	E600	SPECIFICATIONS, LEGENDS, AND DETAILS
37	E601	ELECTRICAL DETAILS
38		
39		PLUMBING DRAWINGS
40		
41	P100	PLUMBING GAS TO GENERATOR PLAN
42	P101	PLUMBING FLOOR PLAN SANITARY & VENT
43	P102	PLUMBING FLOOR PLAN WATER PIPING
44	P301	PLUMBING DETAILS AND SCHEDULES
45	P302	PLUMBING DETAILS AND SCHEDULES
46	P303	PLUMBING DETAILS AND SCHEDULES
47	P304	PLUMBING DETAILS AND SCHEDULES
48	P305	PLUMBING RISERS

PROJECT MANUAL TABLE OF CONTENTS

BRAZOS TRANSIT DISTRICT
ENGINEER'S PROJECT 1909

SPECIFICATIONS

DIVISION 21	FIRE PROTECTION SYSTEM	
SECTION 21 13 13	FIRE SPRINKLER SYSTEM	6 PAGES
DIVISION 22	PLUMBING	
SECTION 22 00 00	GENERAL PLUMBING	8 PAGES
SECTION 22 05 53	IDENTIFICATION OF PLUMBING PIPING AND EQUIPMENT	2 PAGES
SECTION 22 07 19	PLUMBING PIPING INSULATION	4 PAGES
SECTION 22 11 11	NATURAL GAS PIPING	7 PAGES
SECTION 22 11 16	DOMESTIC WATER PIPING	6 PAGES
SECTION 22 11 19	DOMESTIC WATER PIPING SPECIALTIES	2 PAGES
SECTION 22 13 16	SANITARY WASTE AND VENT PIPING	6 PAGES
SECTION 22 13 19	SANITARY WASTE PIPING SPECIALTIES	2 PAGES
SECTION 22 13 23	SANITARY WASTE INTERCEPTORS	1 PAGE
SECTION 22 33 33	COMMERCIAL ELECTRIC WATER HEATERS	1 PAGE
SECTION 22 42 00	COMMERCIAL PLUMBING FIXTURES	3 PAGES
DIVISION 23	HEATING, VENTILATION AND AIR CONDITIONING	
SECTION 23 00 00	GENERAL HVAC	7 PAGES
SECTION 23 05 48	VIBRATION CONTROLS	3 PAGES
SECTION 23 05 53	IDENTIFICATION OF HVAC PIPING AND EQUIPMENT	1 PAGE
SECTION 23 05 93	HVAC TESTING AND BALANCING	7 PAGES
SECTION 23 07 00	HVAC INSULATION	2 PAGES
SECTION 23 20 00	HVAC PIPING	4 PAGES
SECTION 23 31 00	HVAC METAL DUCTS & CASINGS	4 PAGES
SECTION 23 31 10	AIR DUCT ACCESSORIES	3 PAGES
SECTION 23 34 00	HVAC FANS	1 PAGE
SECTION 23 37 00	DIFFUSERS REGISTERS AND GRILLES	2 PAGES
SECTION 23 41 00	PARTICULATE AIR FILTRATION	1 PAGE
SECTION 23 64 00	DUCTLESS DX-SPLIT SYSTEMS	2 PAGES
SECTION 23 65 00	VARIABLE REFRIGERANT DX SYSTEMS	11 PAGES
SECTION 23 82 39	UNIT HEATERS	1 PAGE
DIVISION 26	ELECTRICAL	
SECTION 26 00 00	GENERAL ELECTRICAL	13 PAGES
SECTION 26 05 00	ELECTRICAL WIRING	16 PAGES
SECTION 26 06 00	ELECTRICAL SWITCHGEAR	6 PAGES
SECTION 26 09 26	LIGHTING CONTROL DEVICES AND EQUIPMENT	6 PAGES
SECTION 26 10 10	AUXILIARY SYSTEM	1 PAGE
SECTION 26 27 26	WIRING DEVICES AND MISC. ELECTRICAL EQUIPMENT	2 PAGES
SECTION 26 32 13	NATURAL GAS STANDBY GENERATOR AND TRANSFER SWITCH	3 PAGES
SECTION 26 50 00	LIGHT FIXTURES	3 PAGES



Brazos Transit District

Request for Proposals RFP # BTD-CCC2019

Brazos Transit District New Coordination Complex Center

**Submitted By
Brazos Transit District
1759 N. Earl Rudder Freeway
Bryan, Texas 77803**

September 4, 2019

Table of Contents

Section 1 Request for Proposals	3
1.1 Introduction	3
1.2 Vendor Registration	3
1.3 Solicitation Data	3
1.4 Offeror Communications and Requests.....	4
1.5 Instruction to Offerors	5
1.6 Evaluation Criteria and Procedures	7
1.7 Response to Proposals	9
1.8 Type and Term of Contract	13
1.9 Invoicing and Payment.....	13
1.10 Bonding and Insurance	13
1.11 Disadvantaged Business Enterprises.....	13
Section 2 Project Specifications	15
2.1 Purpose	15
2.2 Warranty	15
2.3 Scope of Work.....	15
Section 3 Required Forms	18
3.1 Acknowledgment of Addendum	18
3.2 Request for Change or Approved Equal.....	19
3.3 Proposal Deviation Form.....	20
3.4 Buy America	21
3.5 DBE Compliance Statement	22
3.6 DBE Schedule of Utilization.....	23
3.7 DBE Good Faith Effort Documentation	24
3.8 Conflict of Interest Acknowledgment and Certification	26
3.9 References - Vendor	27
3.10 Proposal Form	28
3.11 Suspension and Debarment Certification Form.....	32
3.12 Delinquent State Business Tax Certification	34
3.13 Offer	35
3.14 PTN-130.....	36
3.15 Lobbying Certification	37
Section 4 Required Federal Clauses	38
4.1 Access.....	38
4.2 Bonding Requirements	38
4.3 Clean Air Act and Federal Water Pollution Control Act	39
4.4 Civil Rights	39
4.5 Disadvantaged Business Enterprises.....	40
4.6 Employee Protections.....	40
4.7 Government-Wide Debarment and Suspension.....	41
4.8 No Government Obligation to Third Parties	41
4.9 Program Fraud and False or Fraudulent Statements or Related Acts	41
4.10 Termination.....	41
4.11 Buy America	41
4.12 Lobbying.....	42
4.13 Energy Conservation	42
4.14 Interest of Members of, or Delegates to, Congress.....	42
4.15 Prohibited Interest	42
4.16 Policies for all Tiers	42
4.17 Federal Changes.....	42
4.18 Incorporation of FTA Terms	42

4.19	Disputes	43
4.20	Drug and Alcohol Testing/Use	43

Section 1 Request for Proposals

1.1 Introduction

Brazos Transit District (BTD) is a political subdivision of the State of Texas, created pursuant Chapter 452, Transportation Code of Texas. BTD provides general public transportation in 16 counties in Central and East Texas that include fixed bus routes, ADA Paratransit and demand and response service. BTD is the recipient of Federal Transit Administration (FTA) and Texas Department of Transportation (TxDOT) funding. This project may be financed jointly by federal, state and local authorities, including FTA and TxDOT.

The Request for Proposals (RFP) process and the performance of the requested services will be in accordance with the guidelines and regulations of the FTA “Third Party Contracting Guidelines”, FTA Circular 4220.1F and all other applicable federal, state and local laws and regulations. BTD is a tax-exempt organization and is free from all state and federal taxes. No such taxes shall be included in the Offeror's charges to BTD. All costs incurred in the preparation of the proposal responding to this RFP will be the responsibility of the Offeror and will not be reimbursed by BTD. Issuance of this RFP and receipt of proposals does not commit BTD to award a contract. BTD reserves the right to postpone the proposal opening for its own convenience, to accept or reject any or all proposals received in response to this RFP, or to cancel all or part of this RFP for sound business reasons, at any time before the Contract is fully executed and approved on behalf of BTD.

BTD is soliciting qualified proposals for the Brazos Transit District Coordination Complex Center located at 1759 N. Earl Rudder Freeway, Bryan, Texas 77803. BTD has the right to award to multiple contractors as needed and the right to award all, part or none of the project listed in this RFP.

1.2 Vendor Registration

Prospective Offerors must be registered with BTD and must complete a registration form online by visiting our website at www.btd.org

1.3 Solicitation Data

Solicitation Schedule

RFP Release Date	September 4, 2019
Mandatory Pre-Proposal Conference and Site Visit.....	September 17, 2019 at 10:00 a.m. CST
Questions due to BTD	September 23, 2019 at 4:00 p.m. CST
BTD Responses to Questions and Deviations due	September 30, 2019 by 4:00 p.m. CST
Proposals Due (Base Bid)	October 15, 2019 by 2:00 p.m. CST
Proposals Due (Alternate Bid).....	October 15, 2019 by 3:00 p.m. CST
Contract Award	November 5, 2019

BTD reserves the right to make changes to the above-mentioned schedule. All such changes shall be made by an amendment to the solicitation or a letter to all the firms.

Pre-Proposal Site Visit

A mandatory pre-proposal conference will be held on September 17, 2019 at 10:00am, in BTD’s conference room at 1759 N. Earl Rudder Freeway, Bryan, Texas 77803. Participants will be able to walk the project site at the end of the pre-proposal conference. The Point of Contact for project questions during the bidding period is Alivia Youree email is procurement@btd.org. Questions will be answered via addenda.

Procuring Agency:

Brazos Transit District
1759 N. Earl Rudder Freeway
Bryan, Texas 77803

Contracting Officer:

Wendy Weedon, General Manager/Executive VP
Phone: (979)778-0607 Fax: (979)778-3606
E-Mail: procurement@btd.org

Scope

BTD is seeking a professional, experienced general contractor to construct the new Coordination Complex Center and associated site work, storm sewer and other utilities. BTD has the right to award all, part or none of the project listed in this RFP.

Contractor will be responsible for obtaining all required permits and must be licensed, bonded, and authorized to do business within the State of Texas.

Offerors should not submit a proposal unless they can provide multiple and consistent references for similar work done within the past five years.

Where two or more Offerors desire to submit a single bid in response to this RFP, they should do so on a Prime/Subcontractor basis rather than on a joint venture basis. BTD intends to contract with a single Offeror and not with multiple Offerors doing business as a joint venture.

The selected Offeror will NOT be allowed to utilize a finance company for the purpose of factoring invoices. Payment for services will be in the form of check made out to the company indicated in the contract terms.

1.4 Offeror Communications and Requests

Communication or correspondence in regarding any aspect of this solicitation or offers will only be with the designated representative, as listed in Section 1.3. Offerors shall not make any contact with or communicate with any other members of BTD, its employees and consultants.

All questions and communication regarding any aspect of this RFP #BTD-CCC2019 must be in writing and directed to Alivia Youree at procurement@btd.org . Offerors may request a clarification or interpretation of any aspect, a deviation or a change to any requirement of the RFP or any addendum to the RFP up to September 23, 2019 at 4:00 p.m. CST. Deviation requests are to be submitted on the deviation form.

Responses to written requests will be provided in the form of addendum only. Only written responses provided as addendum shall be official and all other forms of communication with any officer, employee or agent of BTD shall not be binding by BTD. Any clarifications or further instructions to Offerors, whether as a result of questions raised by Offerors or initiated by BTD itself, will be sent to all Offerors in written addendum form.

Addendum to RFP

BTD reserves the right to amend the RFP at any time. Any amendments to or interpretations of the RFP will be in written addendum. Prospective Offerors officially known to have received the RFP will be emailed or mailed the addendum. Offerors are responsible to collect the addendum from the Contracting Officer. Failure of any prospective Offeror to receive any addendum will not relieve the Offeror from any obligation under its proposal as submitted or under the RFP, as clarified, interpreted or modified. All addendum issued will become part of the RFP. Prospective Offerors must acknowledge the receipt of each individual addendum in their proposal. Failure to acknowledge any addendum in the submitted proposals may at BTD's sole option disqualify the proposal.

If BTD determines that the addendum may require significant changes in the preparation of proposals, the deadline for submitting the proposals may be postponed to allow Offerors sufficient time to revise their proposals and the new due date shall be included in the addendum.

Conditions, Exceptions, Reservations or Understandings

Proposals stating conditions, exceptions, reservations or understandings (hereinafter “deviations”) relating to the RFP may be rejected. Offerors may submit an alternate proposal that states deviations so long as a basic proposal not containing deviations is submitted. Offerors may propose alternates either within one overall proposal or by submitting more than one proposal.

Any and all deviations must be explicitly, fully and separately stated in the proposal by completing the Proposal Deviation Form, setting forth at a minimum the specific reasons for each deviation so that it can be fully considered and, if appropriate, evaluated by BTD. All deviations not found by BTD to be unacceptable shall be evaluated in accordance with the appropriate evaluation criteria and procedures, and may result in the Offeror receiving a less favorable evaluation than without the deviation.

1.5 Instruction to Offerors

Submission Requirements

Sealed proposals in one original and three copies must be received by October 15, 2019 by 2:00 p.m. CST for the Base Bid and 3:00 p.m. CST for Alternate Bids.

Proposals and subsequent offers shall be valid for a period of 60 days. Late proposals will be returned to Offeror unopened and will not be considered under any circumstances. Faxed or emailed proposal are not acceptable and will not be considered for award.

The sealed envelope will be addressed as below and must contain the Offerors name and address and be clearly marked: “Proposal for Brazos Transit District Coordination Complex Center RFP #BTD-CCC2019”. All proposals are to be submitted to:

Brazos Transit District
Wendy Weedon, General Manager/Executive VP
1759 N. Earl Rudder Freeway
Bryan, Texas 77803

Proposal Format and Contents Requirements

Failure to provide the required information with the Proposal may automatically disqualify the Proposal from consideration for award.

Proposals must be submitted on 8.5 x 11” white paper, using a simple method of fastening. They should be typed and a lengthy narrative is discouraged. To provide for comparability between proposals, all proposals **must be submitted in the following order separated by tabs**. Vendors not addressing these topics or not using the prescribed order may be judged non-responsive and disqualified from the RFP process.

Tab 1 Business Organization. State the full name, address, and phone number of the Offeror and, if applicable, the branch office or division that will perform or assist in performing the work. The capacity of the person submitting the proposal should also be provided. Indicate whether the Offeror is licensed to operate in the State of Texas, Brazos County, Texas, and the City of Bryan, Texas.

If the Offeror is a partnership, limited liability company, limited partnership, or joint venture, the proposal should state the full names and addresses of all partners, members, or joint ventures’ who own at least a 10% interest in the Offeror.

The person signing the proposal must initial any erasures, corrections, or other changes appearing on the proposal form.

Tab 2 Required Forms and Certifications: (Required Forms Section)

- Acknowledgment of Addendum - If addendums have been released
- Request for Change or Approved Equal

- Proposal Deviation - (Only if Offeror requested deviation)
- Buy America
- DBE Compliance Statement
- DBE Schedule of Utilization
- DBE Good Faith Effort
- Conflict of Interest
- References- Vendor
- Pricing Schedule
- Suspension and Debarment Certification Form
- Delinquent State Business Tax Certification
- Offer
- PTN-130
- Lobbying Certification

Tab 3 Purpose of Proposal. State in precise terms the means by which the Scope of Services will be fulfilled.

Tab 4 Statement of Qualifications. Provide a complete AIA A305 Qualification Statement and all supporting documentation. The Offerors' experience and history relevant to BTB's needs should be discussed, including a description of the Offeror's direct experience where services comparable in size and scope has been performed in the last five years. Offeror shall provide the name, address and telephone numbers of persons who may be contacted as references. Offeror shall also include dates, locations, costs and project managers for these previous projects.

Tab 5 Criminal Background. For all persons and entities mentioned in any of the foregoing responses, indicate whether they (1) have ever been convicted of, (2) have an indictment pending for, or (3) have during the last five years been investigated for a criminal offense that is not related to the operation of an automobile. Convictions, indictments or investigations for the crime of driving while intoxicated shall be disclosed. Convictions indictments, or investigations shall be disclosed regardless of whether for a violation of federal, state, local or non-U.S. laws.

Tab 6 Willingness to Contract: State that the Offeror is willing to enter into a Contract consistent with the terms herein.

Tab 7 Timeline. Please provide a detailed project timeline including estimated start dates, schedule of activities, deliverables and resources to be used.

Tab 8 Bid Form

Tab 9 Warranty Information. If applicable to any work performed or equipment installed.

Tab 10 Insurance and Bonding: (Section 2.6)

Liability Insurance. Attach Certificate of Liability insurance

Workman's Compensation. Attach Information Page from Worker's Compensation policy

Bid Guarantee Bond. 5% for construction projects over \$100,000

Performance Bond. 100%

Employer Dishonesty Bond. Attach proof of Dishonesty Bond

If Offeror does not have the above insurances in the minimum amounts required, a letter from an underwriter confirming that the Offeror can be insured for the required minimum amounts is to be submitted.

Tab 11 Qualification Requirements

- Financial Statements must be made available. Offeror's Financial Statements must be prepared in accordance with the United States Generally Accepted Accounting Principles (GAAP) and audited by an independent certified public accountant authorized to practice in the jurisdiction

of either BTD or the Offeror OR Financial statements that have been reviewed or compiled by an accountant.

- Financial Guaranty: Willingness of any parent company to provide the required financial guaranty evidenced by a letter of commitment signed by an officer of the parent company having the authority to execute the parent company guaranty.

Tab 12 Safety and Security Describe the offeror’s safety and security measures taken on a job.

Equipment & Supplies

All equipment and supplies should be supplied by the contractor.

Tax Exempt

The Offeror recognizes that BTD is exempt from the payment of certain Federal, State and local taxes, and that such taxes are not to be included in the proposal price. BTD will furnish a Contractor with the necessary tax-exempt certificates.

Warranty

The agreement will include a full 1-year warranty to BTD. There should be a labor warranty as well.

Modification or Withdrawal or Proposals

A modification of a proposal already received will be accepted by BTD only if the modification is received prior to the proposal due date or is specifically requested by BTD. All modifications shall be made in writing and executed and submitted in the same form and manner as the original proposal.

An Offeror may withdraw a proposal prior to the proposal due date by submitting a written request for withdrawal executed by the Offeror's authorized representative. The Offeror may submit another proposal within the time set for receipt of proposals. This provision for modification and withdrawal of proposals may not be utilized by an Offeror as a means to submit a late proposal and as such, will not alter BTD's right to reject a proposal.

Confidentiality of Proposals

When the award is made and an agreement is executed proposals are subject to review under the "Public Information Act". To the extent permitted by law, Offerors may designate those portions of the offer which contain proprietary information, trade secrets or confidential commercial and financial information that an Offeror believes should be exempted from disclosure are to remain confidential. Such information shall accompany the proposal, be readily separable from the proposal and shall be clearly marked "CONFIDENTIAL". Blanket-type identification by designating whole pages or sections as containing proprietary information, trade secrets or confidential commercial and financial information will not assure confidentiality. The specific proprietary information, trade secrets or confidential commercial and financial information must be clearly identified as such.

1.6 Evaluation Criteria and Procedures

Proposals will be evaluated and ranked on the basis of the following factors, the weights of which are:

Prior Experience, Qualifications & Company History	20%
References	25%
Delivery/Construction Timeline	20%
Pricing Structure.....	20%
Completeness/Other Factors Important to BTD.....	15%

All aspects of the evaluations of the proposals and any discussions/negotiations, including documentation, correspondence and meetings, will be kept confidential during the evaluation and negotiation process.

Proposals will be analyzed for conformance with the instructions and requirements of the RFP and Contract documents. Proposals that do not comply with these instructions and do not include the required information may be rejected as insufficient or not be considered for the competitive range. BTB reserves the right to request an Offeror to provide any missing information and to make corrections. Offerors are advised that the detailed evaluation forms and procedures will follow the same proposal format and organization specified in the Instructions to Offerors. Therefore, Offerors shall pay close attention to and strictly follow all instructions. Submittal of a proposal will signify that the Offeror has accepted the whole of the Contract documents, except such conditions, exceptions, reservations or understandings explicitly, fully and separately stated on the forms and according to the instructions of Form for Proposal Deviation. Any such conditions, exceptions, reservations or understandings which do not result in the rejection of the proposal are subject to evaluation under the criteria of Proposal Evaluation Criteria.

BTB will select for any award the highest ranked proposal from a responsible Offeror, qualified under Qualification Requirements which does not render this procurement financially infeasible and is judged to be most advantageous to BTB based on consideration of the evaluation Proposal Evaluation Criteria. BTB will attempt to contract with the highest ranked offeror. Should an agreement not be possible, BTB will move to the second-highest ranked offeror.

Evaluations of Competitive Proposals

1. **Qualification of Responsible Offerors.** Proposals will be evaluated to determine the responsibility of Offerors. A final determination of an Offeror's responsibility will be made upon the basis of initial information submitted in the proposal, any information submitted upon request by BTB, and information resulting from BTB's inquiry of Offeror's references and its own knowledge of the Offeror.
2. **Detailed Evaluation of Proposals and Determination of Competitive Range.** Each proposal will be evaluated in accordance with the requirements and criteria specified in "Proposal Selection Process".

The following are the minimum requirements that must be met for a proposal to be considered for the competitive range. All of these requirements must be met; therefore, they are not listed by any particular order of importance. Any proposal that BTB finds not to meet these requirements and may not be made to meet these requirements, may be determined by BTB to not be considered for the competitive range. The requirements are as follows:

- a. Offeror is initially evaluated as responsible in accordance with the requirements of "Qualification Requirements", or that BTB finds it is reasonable that said proposal can be modified to meet said requirements. Final determination of responsibility will be made with final evaluations.
- b. Offeror has followed the instructions of the RFP and included sufficient detailed information, such that the proposal can be evaluated. Any deficiencies in this regard must be determined by BTB to be either a defect that BTB will waive in accordance with "Acceptance/Rejection of Proposals" or that the proposal can be sufficiently modified to meet these requirements.
- c. Proposal price would not render this procurement financially infeasible, or it is reasonable that such proposal price might be reduced to render the procurement financially feasible.

BTB will carry out and document its evaluations in accordance with the criteria and procedures of "Proposal Selection Process". Any extreme proposal deficiencies which may render a proposal unacceptable will be documented. BTB will make specific notes of questions, issues, concerns and areas requiring clarification by Offerors and to be discussed in any meetings held with Offerors which BTB finds to be within the competitive range.

Rankings and spreads of the proposals against the evaluation criteria will then be made by BTB as a means of judging the overall relative spread between proposals and of determining which proposals are within the competitive range or may be reasonably made to be within the competitive range.

3. **Proposals not within the Competitive Range.** Offerors of any proposals that have been determined by BTB as not in the competitive range and cannot be reasonably made to be within the competitive range will be notified in writing, including the shortcomings of their proposals.
4. **Discussions with Offerors in the Competitive Range.** The Offerors whose proposals are found by BTB to be within the competitive range or may be reasonably made to be within the competitive range, will be contacted by BTB to answer any questions and/or requests for clarifications. The highest-ranked Offeror may be invited for a private interview(s)/discussions with BTB to discuss answers to written or oral questions, clarifications and any facet of its proposal.

In the event that a proposal, which has been included in the competitive range, contains conditions, exceptions, reservations or understandings to any Contract requirements as provided in "Form for Proposal Deviation", said conditions, exceptions, reservations or understandings may be negotiated during these meetings. However, BTB shall have the right to reject any and all such conditions and/or exceptions and instruct the Offeror to amend its proposal and remove said conditions and/or exceptions; and any Offeror failing to do so may cause BTB to find such proposal to be outside the competitive range.

No information, financial or otherwise, will be provided to any Offeror about any of the proposals from other Offerors. Offerors will not be given a specific price or specific financial requirements they must meet to gain further consideration, except that proposed prices may be considered to be too high with respect to the marketplace or unacceptable. Offerors will not be told of their rankings among the other Offerors.

5. **Best and Final Offers (BAFO).** Offerors are reminded the BAFO's may not be requested and therefore their first submission should always be their best possible offer.

BTB will make the award to the responsible Offeror whose proposal is most advantageous to BTB. Accordingly, BTB may not necessarily make an award to the Offeror with the lowest price proposal if doing so would not be in the overall best interest of BTB.

BTB reserves the right to make an award to an Offeror whose proposal it judges to be most advantageous to BTB based upon the evaluation criteria, without conducting any written or oral discussions with any Offerors or solicitation of any BAFO's.

1.7 Response to Proposals

Acceptance/Rejection of Proposals

BTB reserves the right to reject any or all proposals for sound business reasons, to undertake discussions with one or more Offerors and to accept that proposal or modified proposal which, in its judgment, will be most advantageous to BTB, price and other evaluation criteria considered. BTB reserves the right to consider any specific proposal which is conditional or not prepared in accordance with the instructions and requirements of this RFP to be noncompetitive. BTB reserves the right to waive any defects or minor informalities or irregularities in any proposal which do not materially affect the proposal or prejudice other Offerors.

If there is any evidence indicating that two or more Offerors are in collusion to restrict competition or otherwise engaged in anti-competitive practices, the proposals of all such Offerors shall be rejected and such evidence may be a cause for disqualification of the participants in any future solicitations undertaken by BTB.

BTB may reject a proposal that includes unacceptable deviations as provided in "Conditions, Exceptions, Reservations or Understandings"

Single Proposal Response

If only one proposal is received in response to this RFP and it is found by BTB to be acceptable, a detailed price/cost proposal may be requested of the single Offeror. A price or cost analysis, or both, possibly including an audit, may be performed by or for BTB of the detailed price/cost proposal in order to determine if the price is fair and reasonable. The Offeror has agreed to such analysis by submitting a proposal in response to this RFP.

Price analysis: An evaluation of a proposed price that does not involve an in-depth evaluation of all the separate cost elements and the profit factors that comprise an Offeror's price proposal. It should be recognized that a price analysis through comparison to other similar procurements must be based on an established or competitive price of the elements used in the comparison. The comparison must be made to a purchase of similar quantity, involving similar specifications and in a similar time frame. Where a difference exists, a detailed analysis must be made of this difference and costs attached thereto.

Where it is impossible to obtain a valid price analysis, it may be necessary to conduct a cost analysis of the proposed price.

Cost analysis: A more detailed evaluation of the cost elements in the Offeror's offer to perform. It is conducted to form an opinion as to the degree to which the proposed costs represent what the Offeror's performance should cost. A cost analysis is generally conducted to determine whether the Offeror is applying sound management in proposing the application of resources to the contracted effort and whether costs are allowable, allocable and reasonable.

Any such analyses and the results there from shall not obligate BTB to accept such a single proposal; and BTB may reject such proposal at its sole discretion.

Appeals

Appeals to BTB's decision of approved equals or clarifications of specifications must be in writing and received by BTB by the time specified in the schedule. BTB has no obligation to consider appeals not received within the time specified in the Schedule.

Protests

Protests resulting from the award of a contract through the RFP procedure must be made in writing to BTB's Contracting Officer within three working days of the letter of non-selection to the Offeror. The protest must outline the specific portion of the specification or proposal procedure that had been violated.

Protests by an interested party regarding this procurement shall be made in accordance with Chapter 2155 of the Texas Government Code. After such administrative remedies have been exhausted, an interested party may file a protest with the Federal Transit Administration (FTA) or the U.S. Department of Transportation pursuant to the procedures provided in FTA C 4220.1F or the Texas Department of Transportation (TxDOT). Alleged violations of certain federal requirements provide a separate complaint procedure. See, for example, Buy America Requirements, 49 CFR 661 and Participation by Disadvantaged Business Enterprise in Department of Transportation Programs, 49 CFR 23.

Failure to comply with the above protest procedures will render a protest untimely and/or inadequate and shall result in its rejection.

Conflict of Interest

Effective January 1, 2006, Chapter 176 of the Texas Local Government Code (House Bill 914) requires that any vendor or person considering doing business with a local government entity disclose the vendor or person's affiliation or business relationship that might cause a conflict of interest with a local government entity. The Conflict of Interest Questionnaire form is included in the Forms Section. Any attempt to intentionally or unintentionally conceal or obfuscate a conflict of interest may automatically result in the disqualification of the Offeror.

Disclosure of Interested Parties

In 2015, the Texas Legislature adopted House Bill 1295, which added section 2252.908 of the Government Code. The law states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties (Form 1295), which is available at https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm, to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency. BTD require the selected Contractor to file Form 1295 electronically with the Commission at the time of Contract Award.

Bid Protest Policy

Protests resulting from the award of a contract through the RFP procedure must be made in writing to BTD's Contracting Officer within three working days of the letter of non-selection to the Offeror or proposer. The protest must outline the specific portion of the specification or proposal procedure that had been violated.

As an FTA funding recipient, BTD is required to notify and keep FTA updated about the status of the protest when it receives a third-party contract protest to which this circular applies an award given by BTD.

The protester must exhaust its administrative remedies by pursuing the recipient's protest procedures to completion before appealing the recipient's decision to FTA.

Protests by an interested party, as in a party that is an actual or prospective Offeror whose direct economic interest would be affected by the award or failure to award the third-party contract at issue, regarding this procurement shall be made in accordance with Chapter 2155 of the Texas Government Code. After such administrative remedies, have been exhausted, an interested party may file a protest with the Federal Transit Administration (FTA) or the U.S. Department of Transportation pursuant to the procedures provided in FTA C 4220.1F. Alleged violations of certain federal requirements provide a separate complaint procedure. See, for example, Buy America Requirements, 49 CFR 661 and Participation by Disadvantaged Business Enterprise in Department of Transportation Programs, 49 CFR 23.

The protester must deliver its appeal to the FTA Regional Administrator within five working days of the date when the protestor has received actual or constructive notice of the recipient's final decision or when the protestor has identified other grounds for appeal to FTA, such as, the recipient's failure to have or failure to comply with its protest procedures or failure to review the protest.

Failure to comply with the above protest procedures renders a protest untimely and/or inadequate and shall result in its rejection.

In the event of a timely protest received by the Contracting Officer, the following steps are performed:

The Contracting Officer affects a stay of procurement during the protest.

- If the contract has not been awarded, award is delayed until all administrative and judicial remedies have been exhausted. All Offerors or proposers on the vendor mailing list are advised of the protest and of the delay in the procurement.
- The President/CEO may make a determination, in writing, that the award of a contract without delay is necessary to protect the interests of BTM. This written determination is made part of the contract file by the Contracting Officer.
- The Contracting Officer notifies the President/CEO and the affected department head that a bid or proposal protest has been received.
- The Contracting Officer conducts an investigation into the protest with the assistance of BTM staff or other personnel as required.
- The Contracting Officer may meet with the protesting vendor or request additional information from the vendor during the investigation
- The Contracting Officer issues the findings of the investigation in writing to all interested parties and the written report, including the original protest, is made a part of the contract file.
- The Grants and Budget Department acts as the direct liaison with FTA. The Contracting Officer supplies any records or documents requested by the Grants and Budget Department for FTA.
- The Contracting Officer makes any necessary changes to the procurement process, as pertaining to the protested bid/proposal, resulting from FTA's decision.
- The Contracting Officer makes the written report of FTA, including all related correspondence, a part of the contract file.

Contractor Status

Contractor is an independent Contractor of BTM, and all persons employed to furnish services or to perform work hereunder are employees, agents or Subcontractors of Contractor and not of BTM. No provision of this agreement shall be construed to give rise to a partnership, joint venture, agency, employer/employee relationship or any relationship between Contractor and BTM other than that of principal and independent Contractor.

Indemnification/Defense of BTM

Contractor agrees to and does hereby assume full liability and responsibility for and hereby releases and covenants and agrees to indemnify, hold harmless and defend BTM and the members of the Board of Directors and executive committee, officers, principals, agents and employees of each of them (hereinafter collectively "Indemnified Persons") from and against any and all damages, payments, costs, losses, expenses, and liability of every kind whatsoever related to all claims for damages or injuries to persons or property of any nature whatsoever (including any claims which may arise on the part of the Contractor, its officers, agents, principals, employees, and subcontractors) arising out of or incident to this solicitation or the contract(s) resulting from this solicitation, or which are in any way related to such solicitation or contract(s) or to Contractor's activities thereunder, or are incident to the grant or exercises of any of the rights and privileges described in such solicitation or contract(s), other than claims resulting solely from the negligence of one or more of the Indemnified Persons. By way of inclusion and not limitation, the liability and responsibility assumed and the claims, damages, payments and expenses released and indemnified against are specifically agreed to include any growing out of or related to libel, slander, and the like, and infringement of patents, copyrights, trademarks, service marks and the like, including claims arising out of the use by any of the Indemnified Persons of any documentation, publication, appliance, tool, equipment or apparatus supplied under such solicitation or contract(s).

BTD will promptly notify Contractor of any such claim and will cooperate with Contractor in defending against any such claim. In the event any suit or legal proceeding of any kind is brought against any of the Indemnified Persons on account of any claim described in the preceding paragraph, Contractor agrees to assume the defense thereof and to pay all expenses relating thereto and in connection therewith and all judgments and levies that may be obtained against any of the Indemnified Persons as a result of any such suit or proceeding, specifically including fines, penalties, attorney's fees, exemplary damages, and interest; and Contractor agrees to at once cause any such judgments and levies to be dissolved and discharged by paying same, giving bond or otherwise.

Contractor also agrees to pay BTD promptly upon receipt of statements therefore, any and all attorney's fees and other expenses reasonably incurred by them directly or indirectly related to any claims.

No Assignment

Any contract resulting from or related to this solicitation and all rights and obligations thereunder are non-assignable in whole or in part by Contractor without the prior express written consent of BTD, and any attempted assignment without such consent shall constitute a material default of Contractor under the underlying contract, and may be considered void for all purposes at the election of BTD.

1.4 Type and Term of Contract

BTD shall negotiate and enter into a fixed contract cost for all work to be performed. BTD has the right to award to multiple contractors as needed and also the right to award all, part or none of the projects listed in this RFP.

1.5 Invoicing and Payment

Invoices are to be submitted to BTD's Administrative Office located at 1759 N. Earl Rudder Freeway, Bryan, Texas 77803. BTD is tax exempt therefore, invoices cannot include any sales taxes.

BTD agrees to pay all invoices on a net 30-day payment cycle or three days after the receipt of State and Federal funds, whichever is later. This Agreement is contingent upon the receipt of State and Federal funds. Loss of such funds will nullify this contract.

1.6 Bonding and Insurance

General Liability Insurance. Contractor will be required to carry liability insurance for the length of the contract in of amount of \$1 million for the length of the contract.

Workman's Compensation. Contractor will be required to carry Workers Compensation Insurance for the length of the contract.

Employee Dishonesty Bond. Contract will be required to carry an employee Dishonesty bond in the amount of \$20,000 for the length of the contract.

Bid Guarantee Bond. Contractor will be required to carry a 5% bid guarantee bond.

Performance Bond. Contractor will be required to carry a 100% performance pond.

Payment Bond. Equal to:

- 50% for contracts <\$1M.
- 40% for contracts >\$1M- <\$5M.
- \$2.5M for contracts >\$5M

After award, proof of the required insurance will be required prior to contract signing.

BTD is to be named as additional insured on the General Liability Insurance. The General Liability and Workers Compensation policies must include a Waiver of Subrogation in favor of BTD. The insurance policies provided

by Contractor shall also be endorsed to provide BTD with 60 days advance written notice prior to any cancellation or reduction in coverage, and 10 days' notice for non-payment of premium.

1.7 Disadvantaged Business Enterprises

This contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs. The national goal for participation of Disadvantaged Business Enterprises (DBE) is 10%. The agency's overall goal for DBE participation is 5.37%.

The Contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this contract. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as BTD deems appropriate. Each subcontract the Contractor signs with a Subcontractor must include the assurance in this paragraph (see 49 CFR 26.13(b)).

Offerors are required to document sufficient DBE participation to meet these goals or, alternatively, document adequate good faith efforts to do so, as provided for in 49 CFR 26.53. Award of this contract is conditioned on submission of the following concurrent with and accompanying sealed bid:

1. The names and addresses of DBE firms that will participate in this contract;
2. A description of the work each DBE will perform;
3. The dollar amount of the participation of each DBE firm participating;
4. Written documentation of the Offerors commitment to use a DBE Subcontractor whose participation it submits to meet the contract goal;
5. Written confirmation from the DBE that it is participating in the contract as provided in the prime Contractor's commitment; and
6. If the contract goal is not met, evidence of good faith efforts to do so.

Offerors must present the information required above as a matter of responsiveness with initial proposals.

The Contractor is required to pay its Subcontractors performing work related to this contract for satisfactory performance of that work no later than 30 days after the Contractor's receipt of payment for that work from BTD. In addition, the Contractor is required to return any retainage payments to those Subcontractors within 30 days after the Subcontractor's work related to this contract is satisfactorily completed.

The Contractor must promptly notify BTD, whenever a DBE Subcontractor performing work related to this contract is terminated or fails to complete its work, and must make good faith efforts to engage another DBE Subcontractor to perform at least the same amount of work. The Contractor may not terminate any DBE Subcontractor and perform that work through.

Section 2 Project Specifications

2.1 Purpose

The purpose of BTD's RFP #BTD-CCC2019 is to solicit and retain a professional and experienced general contractor to construct the new Brazos Transit District Coordination Complex Center. BTD has the right to award to multiple contractors as needed and the right to award all, part or none of the projects listed in this RFP.

2.2 Warranty

One (1) Year Warranty Period: In addition to any warranties contained elsewhere in this Contract or implied by law, the Contractor and each subcontractor warrant that, for a period of one year from the date of Final Acceptance, the work performed by this Contract conforms to the contract requirements and is free of any defect of equipment, material, and workmanship performed by the Contractor or any of the subcontractors or suppliers. The Contractor or any subcontractor shall remedy, at their own expense, any such failure to conform or any such defect.

2.3 Scope of Work

Including but not limited to: selective site demolition, new concrete paving & foundation, utilities, structural steel, bar joists & metal deck, metal soffit & wall panels, stone veneer, mid-level interior finish out, glass and glazing, TPO roof, glulam timbers, finish carpentry, doors & hardware, toilet accessories & misc. specialties, low voltage, access controls, technology, mechanical, electrical, and plumbing systems. There will be alternative bid items for rainwater harvesting, emergency generators (2), and Furniture, Fixtures, & Equipment.

Coordination:

- a. **Mutual Responsibility of Contractors:** If, through acts of neglect on the part of the Contractor, any other contractors or any subcontractor shall suffer loss or damage to work, the Contractor agrees to settle with such other Contractor or subcontractor by agreement or arbitration if such other Contractor or subcontractor will so settle. If such other Contractor or subcontractor shall assert any claim against BTD due to any damage alleged to have been sustained, BTD shall notify the Contractor, who shall indemnify and save harmless BTD against any such claim.
- b. **Superintendence by Contractor:**
 1. **Representative on Site:** The Contractor shall give his personal superintendence to the work or have a competent foreman or superintendent hereinafter designated his representative, satisfactory to the Contract Administrator, on the work site at all times during progress, with authority to act for the Contractor. Before starting work, the Contractor shall designate in writing the name, title, qualifications, and experience of this proposed representative and scope of his authority for approval by the Contract Administrator. A facsimile of the designated representative's signature shall be submitted to the Contract Administrator.
 2. **Change of Representative:** The Contractor shall notify the Contract Administrator, in writing, when the Contractor desires to change his representative, and shall follow the procedures specified above (see, "Representative on Site") regarding the new proposed representative.

Uses of the Premises

Before beginning work, the contractor must secure approval from BTD for the following.:

1. Areas permitted for personnel parking.
2. Access to the job site.
3. Areas permitted for storage of materials and debris.

Clean Up

- a. Perform daily clean-up to collect all wrappings, empty containers, paper and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
- b. Prior to the final inspection, the contractor must perform a pre-inspection to review all work and to verify the project has been completed and meets all specifications.

Wages- Must follow Davis Bacon for the minimum wages of all laborer's working upon the site.

Important Links with more information for Davis Bacon Requirements:

<https://www.dol.gov/whd/regs/compliance/whdfs66.pdf>

<https://www.dol.gov/whd/govcontracts/dbra.htm>

<https://www.wdol.gov/dba.aspx> Wage Determination

<https://www.dol.gov/compliance/guide/dbra.htm#RRN>

Surveys, Permits and Regulations: Unless otherwise expressly provided for in this Contract, the Contractor will be responsible for all surveys necessary for the execution of the Work under the Contract. The Contractor will procure and pay for all permits, licenses and approvals necessary for the execution of the Work under the Contract. The Contractor shall comply with all laws, ordinances, rules, orders and regulations relating to the performance of the work, the protection of adjacent property, and the maintenance of passageways, guard fences or other protective facilities.

Damage or Defect: Any supplies, material or equipment damaged or defective at the time of delivery or installation or prior to Final Acceptance shall be repaired, replaced or corrected by the Contractor at the Contractor's cost without additional cost to BTM. If the Contractor shall fail to comply promptly with any order of the Contract Administrator to repair, replace or correct damaged or defective work, then the Contract Administrator shall, upon written notice to the Contractor, have the authority to deduct the cost thereof together with any costs reasonably related thereto, from any compensation due, or to become due to the Contractor (including, but not limited to retainage). Nothing in this section shall limit or restrict the provisions of the warranties as set forth herein, or any warranties that may arise by implication or by law.

Section 3 Required Forms

ALL FORMS BELOW MUST BE SUBMITTED WITH PROPOSAL

- 1. Acknowledgment of Addendum
- 2. Request for Change or Approved Equal
- 3. Proposal Deviation Form
- 4. Buy America
- 5. DBE Compliance Statement
- 6. DBE Schedule of Utilization
- 7. DBE Good Faith Effort
- 8. Conflict of Interest
- 9. References - Vendor
- 10. Pricing Schedule
- 11. Suspension and Debarment Certification Form
- 12. Delinquent State Business Tax Certification
- 13. Offer
- 14. PTN-130
- 15. Lobbying Certification

Failure to submit ALL of the above items properly completed may be cause for disqualification of your bid. All forms must be signed by the person authorized to bind the offering Offeror to the terms of the proposal.

3.1 Acknowledgment of Addendum

RFP #BTD-CCC2019

The undersigned acknowledges receipt of BTD's Request for Proposals and the following addendums to BTD's Solicitation Package.

ACKNOWLEDGMENT OF ADDENDUM

- Addendum No. _____ Dated _____
- Addendum No. _____ Dated _____
- Addendum No. _____ Dated _____
- Addendum No. _____ Dated _____
- Addendum No. _____ Dated _____
- Addendum No. _____ Dated _____

Failure to acknowledge receipt of all amendments may cause Offeror to be considered nonresponsive to the solicitation. Acknowledged receipt of each addendum must be clearly established and included with bid/proposal.

Authorized Signature

Company Name (print)

Name and Title (print)

Date

3.2 Request for Change or Approved Equal

RFP #BTD-CCC2019

This form must be used for requested clarifications, changes, substitutes or approval of items equal to items specified with a brand name, and must be submitted as far in advance of the Due Date as specified in "Solicitation Schedule".

Deviation #: Solicitation Ref: Page: Section:

Questions/Clarification or Approved Equal:

Authorized Signature

Company Name (print)

Name and Title (print)

Date

Brazos Transit District:

3.3 Proposal Deviation Form

RFP #BTD-CCC2019

The following form shall be completed for each condition, exception, reservation or understanding (i.e., deviation) in the proposal according to “Conditions, Exceptions, Reservations and Understandings”.

Deviation #: _____ Page: _____ Section: _____

Complete Description of Deviation:

Rational (Pros & Cons)

Authorized Signature

Company Name (print)

Name and Title (print)

Date

3.4 Buy America

RFP #BTD-CCC2019

Certificate of Compliance

The Offeror hereby certifies that it will comply with the requirements of 49 U.S.C. Section 5323(j)(2)(C), Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, and the regulations of 49 C.F.R. 661.11:

Authorized Signature

Company Name (print)

Name and Title (print)

Date

Or

Certificate of Non-Compliance

The Offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. Section 5323(j)(2)(C) and Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, but may qualify for an exception to the requirements consistent with 49 U.S.C. Sections 5323(j)(2)(B) or (j)(2)(D), Sections 165(b)(2) or (b)(4) of the Surface Transportation Assistance Act, as amended, and regulations in 49 C.F.R. 661.7.

Authorized Signature

Company Name (print)

Name and Title (print)

Date

3.5 DBE Compliance Statement

RFP #BTD-CCC2019

Check the statement which applies to your bid.

1. **Bid meets or exceeds DBE percentage participation goal established for this procurement.**
You must submit the Schedule of DBE Utilization (Forms page A36 in the BPPM) along with bid. If you are a certified DBE, complete the first set of questions on Schedule of DBE Utilization for yourself and submit your certification number from certifying agency. Submit certification numbers for each DBE you intend to use.

2. **Bid does not meet the DBE percentage participation goal established for this procurement, but you have made bona fide good faith efforts to reach those goals.**
If this statement applies, you must submit the Schedule of DBE Utilization and the DBE Good Faith Effort Documents (Forms page A-36 in the BPPM) along with bid, together with all other documentation of good faith efforts which you wish BTB to consider in evaluation your bid. Only documentation submitted with bid will be considered. Submit certification numbers for each DBE you intend to use.

3. **Bid does not have any DBE percentage participation for this procurement, BUT you believe this procurement meets the following exception to BTB's DBE Policy:**
"This solicitation is for the procurement of a standard manufactured item or other similar procurement with no subcontracting opportunities."

Firm should check Yes or NO to both questions below and then explain in the exception information area below. Failure to provide an explanation may render the bid non-responsive. (Subcontracting opportunities may include delivery, assembly, installation, painting, supplies etc. Supplies are items purchased specifically for this procurement other than the standard manufactured item requested by the invitation for bid).

a) Will you perform this entire contract without Subcontractors? Yes No

b) Will you perform this entire contract without suppliers? Yes No

(If you answered NO to either question above, please fully explain why you are seeking the exception. The existence of Subcontractor and supplier opportunities, usually indicate that option #2 and the Good Faith Effort Documents apply.)

Explanation: _____

Authorized Signature

Company Name (print)

Name and Title (print)

Date

(Note: Failure to complete and return the DBE forms as indicated above, will result in rejection of the bid. The making of a material misrepresentation of fact could be a basis of disqualification and may cause a firm to be considered for classification as an irresponsible contractor and barred from BTB work for a period of not exceeding six months).

3.6 DBE Schedule of Utilization

**Information on the DBE program: www.dot.state.tx.us/business/business_outreach/dbe.htm
Certified DBE Vendors: www.dot.state.tx.us/business/tucp/default.htm**

List all DBE's expected to participate in performing the contract resulting from this solicitation. If you have no DBE participation, but you are subcontracting out (i.e. work deliveries, transportation, parts and supplies, etc.) a portion of this procurement, then sign and date this form below and completely and thoroughly fill out and sign the Good Faith Effort Documents.

NOTE: Any firm listed below must be certified by the Texas Unified Certification Program (TUCP) and their corresponding certification number must be listed.

RFP #BTD-CCC2019

Name of prime Contractor (print)

Bid Number

Note: If Prime Contractor is a certified DBE complete first section below for self.

Name of DBE Subcontractor of DBE Prime Contractor:

Address & Telephone Number:

Specify Subcontracting Tier:

Type of Work to be Performed:

Dollar Amount for Work: \$

TUCP Certification#:

Name of DBE Subcontractor of DBE Prime Contractor:

Address & Telephone Number:

Specify Subcontracting Tier:

Type of Work to be Performed:

Dollar Amount for Work: \$

TUCP Certification#:

Name of DBE Subcontractor of DBE Prime Contractor:

Address & Telephone Number:

Specify Subcontracting Tier:

Type of Work to be Performed:

Dollar Amount for Work: \$

TUCP Certification#:

The undersigned will enter into a formal agreement with DBE Subcontractors for work listed above in this schedule conditioned upon execution of a contract with Brazos Transit District.

Signature

Title

Date

(Offeror may make additional copies of this schedule as needed to list all DBE Subcontractors that will be used on this contract.)

3.7 DBE Good Faith Effort Documentation (Page 1 of 2)

RFP #BTD-CCC2019

If the Offeror did not meet or exceed BTD's DBE subcontracting goal, then the Offeror must comply with BTD's DBE policy by documenting that good faith efforts were made. Please place a Yes or No in blanks below for items one, two and three to indicate if you have completed the good faith effort form, attached any related support documents, and provided any additional information/ support/clarification beyond that requested in the good faith effort documents. Item number three (providing additional information) is at the Offeror's responsibility to ensure that sufficient information is provided to BTD, so that good faith efforts can be comprehensively evaluated.

I, the Offeror, have (YES or NO):

- Yes No 1) Completely filled out this good faith effort form with signature and date,
- Yes No 2) Attached any related supporting documents, and also
- Yes No 3) Provided any additional information and/or documents that I (the Offeror) deemed necessary to support and/or clarify the good faith efforts that I made.

It is the Offeror's responsibility to correctly, accurately, and substantively provide all necessary information to BTD, at the time of bid submission. The information provided by the Offeror must be sufficient enough for BTD to determine that the efforts made by the Offeror to obtain DBE participation were such efforts that an Offeror actively and aggressively seeking to meet those goals would make. Actions or efforts which are merely "pro forma" or "going through the motions" do not constitute good faith efforts to obtain the participation of DBEs. BTD will look not only at the different kinds of efforts that the Offeror has made, but also the quality and intensity of those efforts.

This information will then be evaluated by BTD's DBE Department or a designee of BTD for good faith effort compliance. Failure to comply will render the bid non-responsive.

Note: The information requested below is not intended to be an inventory or check list. The DOT does not require BTD to insist that any Offeror do any particular one or any combination of the items on this list. It is not intended to be an exclusive or exhaustive list of all actions an Offeror, acting in good faith actively or aggressively seeking to obtain DBE participation would make. Other types of efforts or factors may be relevant in appropriate cases.

1. Please list each and every subcontracting and/or supplier opportunity which will be available in the completion of this project, regardless of whether it is to be provided by a DBE or non-DBE. Use additional sheets, if needed.

Subcontracting Opportunities	Supplier Opportunities
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

2. Did you obtain a list of DBE firms from BTD's DBE Department? A list may or may not have been included with the Invitation for Bid. If one was not included, or if additional lists are needed they can be obtained from the DBE Department upon request. The DBE Department can provide lists, when requested, by subcontracting areas. Yes No
3. Did you attend the pre-bid teleconference scheduled by BTD? **N/A**
 Did you request bids from DBEs that also attended the pre-bid conference? Yes No
 If Yes, list DBE Firm/Person Contacted.
4. Did you solicit bids from DBEs, within the subcontracting and/or supplier areas that you listed previously on question number one above by mail? Yes No
5. Did you solicit bids from DBEs, within the subcontracting and/or supplier areas that you listed previously on question number one above by fax? Yes No

6. Did you solicit bids from DBEs, within the subcontracting and/or supplier areas that you listed previously on question number one above by telephone? Yes No
7. Did you solicit bids from DBEs, within the subcontracting and/or supplier areas that you listed previously on question number one above by some other means? Yes No If Yes, please explain. _____
8. Did you advertise in local newspapers? Yes No If yes, then please attach a copy(s) of advertisements, with the date advertised and list the specific newspapers that were used.
9. Please provide the following information for every DBE firm that you contacted by any method or that initiated contact with you, but will NOT be used on this contract:
 - _____ a) Attach a listing of every DBE firm that you solicited a bid from or that initiated contact with you to ask about and/or submit an unsolicited bid to you. Include their mailing address, phone and fax numbers, and the date that solicitations were sent. Also, include the method used for the solicitation (i.e. mail, fax, phone, person contact, etc.). If you have a DBE contact name, include that as well.
 - _____ b) Indicate the subcontracting area(s) that you solicited bids on from each DBE firm and/or the subcontracting areas(s) for which each DBE firm submitted a bid to you, if different from what you solicited.
 - _____ c) If DBE firms submitted bids, but those bids were rejected, provide an explanation for rejecting those bids and attach documentation to support the reason for rejecting the bid (i.e. letters, memos, DBE bid amount, telephone notes, meeting notes, etc.)
 - _____ d) If a DBE firm's bid was rejected because of price, then list the DBE firm's bid price and the name and bid price of the Subcontractor or supplier that you will use in lieu of the rejected DBE firm.
 - _____ e) Indicate the number of times that follow-up contact was made with DBE firms after the initial solicitations of interest.
10. Did you contact all DBE firms that you solicited bids from in a timely manner such that the DBE firms had at least ten days prior to the bid submission date to prepare and submit a bid to you? Yes No If No, please explain.
11. Did you negotiate in good faith with interested DBE firms by, for instance, providing timely information regarding plans and specifications, breaking down subcontracts into economically feasible units to facilitate DBE participation, maintaining accessible lines of communications, etc.? Yes No
12. Did you assist interested DBE firms in obtaining bonding, lines of credit, or insurance required by BTD or by you as prime Contractor? Yes No If Yes, please explain.

ADDITIONAL INFORMATION

Please provide any additional information and/or documents that you (the Offeror) deem necessary to support and/or clarify that you made good faith efforts to meet the DBE subcontracting goal (be sure to attach any support documents).

Note: Failure to complete and return DBE forms as indicated above, will result in rejection of the bid. The making of a material misrepresentation of fact could be a basis for disqualification and may cause a firm to be considered for classification as an irresponsible Contractor and barred from BTD work for a period of not exceeding six months.

Authorized Signature

Company Name (print)

Name and Title (print)

Date

3.8 Conflict of Interest Acknowledgment and Certification

RFP #BTD-CCC2019

Policy: A conflict of interest may occur if outside activities or personal interests influence or appear to influence objective decision making in the course of BTD-related responsibilities and duties. A conflict may also exist if the demands of any outside activities hinder or distract your job performance or cause you to use BTD resources for other than BTD purposes. Employees are expected to exhibit professional loyalty to the BTD. Employees are expected to avoid conflicts of interest and opportunities for personal gain for themselves individually, members of their immediate families and others which may impede their best judgment.

The following are guidelines for Board of Directors and employees regarding interests outside of the business conducted by Brazos Transit District:

- A. Employees, or members of their respective families should not have substantial financial or business interest with a competitor, customer or supplier of Brazos Transit District without first reviewing the nature of activity with BTD’s legal counsel.
- B. Each employee’s employment should be his/her first business priority. Any other employment or business activity will be considered secondary and should not interfere with individual employee job performance and responsibilities. Approval for secondary employment requires the approval of the BTD’s President/CEO.

Disclosures: Your obligation, as a prospective Contractor under this solicitation, is to disclose fully all information you have or may acquire which has to do with any such Benefit, which may come to any Related Person or Other Related Person. In considering the possibility of the existence of such benefit, you also need to consider each person and firm you believe may be involved as a joint venturer, or Subcontractor, or other similar role in carrying out and performing a contract with BTD pursuant to the solicitation. In other words, if you are aware of any business, financial, or other interest, or actual or potential employment relationship between any Related Person or any Other Related Person, on the one hand, and yourself or any other person or firm you believe may be involved in carrying out the contract to be awarded pursuant to this solicitation, on the other hand, you have an affirmative obligation to fully disclose that information to BTD. You are encouraged to contact BTD General Manager/Executive Vice President prior to the deadline for submitting your Response (defined as a bid, proposal or other response to this solicitation), make such disclosure, and request a ruling as to whether any prohibited conflict of interest does in fact exist.

In order for your Response to be considered RESPONSIVE to this solicitation, it is mandatory that you complete and execute the Acknowledgment and Certification below, and include with your Response, written disclosure of all information relative to any potential conflict of interest which may be known to you, and which you have not disclosed to BTD in writing prior to the submission of your Response.

(POTENTIAL CONTRACTOR)

The undersigned potential Contractor of BTD hereby acknowledges receipt and understanding of the Conflict of Interest provisions set out above; and hereby certifies that, except as heretofore or herewith fully disclosed in writing, to the best of potential Contractor’s knowledge and belief, no such conflict exists, or is likely to exist in the future pertaining to this procurement should the contract be awarded to potential Contractor; and potential Contractor further hereby promises to promptly notify BTD in writing if such knowledge or belief changes in the future.

By: _____
Signature and Title of Authorized Official of Potential Contractor

Name of Potential Contractor (print)

(RECOMMENDED SUBCONTRACTOR)

The undersigned potential subcontractor of BTD hereby acknowledges receipt and understanding of the Conflict of Interest provisions set out above; and hereby certifies that, except as heretofore or herewith fully disclosed in writing, to the best of potential Subcontractor’s knowledge and belief, no such conflict exists, or is likely to exist in the future pertaining to this procurement should the contract be awarded to potential Subcontractor; and potential Subcontractor further hereby promises to promptly notify BTD in writing if such knowledge or belief changes in the future.

By: _____
Signature and Title of Authorized Official of Recommended Subcontractor

Name of Recommended Subcontractor (print)

Note: Offeror shall make copies of the Conflict of Interest document and Acknowledgment and Certification form and provide same to each Subcontractor Offeror recommends for the contract. Offeror is required to secure an acknowledgment and certification from each Subcontractor Offeror recommends and submit such certification to BTD prior to a Subcontractor beginning any work under this contract.

3.9 References - Vendor

RFP #BTD-CCC2019

Provide a minimum of three references within the past five years in which a similar service was provided. Provide company name, address, contact person, phone, fax, and email. **Be sure to include a valid email as references are check via email.**

Company Name:		
Address:		
Contact Person:		
Email:		
Phone:		Fax:



Company Name:		
Address:		
Contact Person:		
Email:		
Phone:		Fax:



Company Name:		
Address:		
Contact Person:		
Email:		
Phone:		Fax:

3.10 Proposal Form

RFP # BTD-CCC2019

PROPOSAL FORM

Submit on **your** letterhead in a form exactly as set forth below. Fill in all blanks by printing or typing, except provide actual seal and signatures where indicated.

BID DATE: **October 15, 2019 at 2:00pm CST Base Bid**
October 15, 2019 at 3:00pm CST Alternate Bids

To: Brazos Transit District
1759 N. Earl Rudder Freeway
Bryan, TX 77803

Proposal For: **Brazos Transit District New Coordination Complex Center**
2117 Nuches Ln. Bryan, TX 77803

Brazos Transit District
BTD Project No. BTD-CCC2019
PlanNorth Architectural Co. Project No. 1904PN

BIDDER: _____

BIDDER hereby declares that he has: a) carefully examined the Bidding Documents; b) a clear understanding of the Bidding Documents; c) personally inspected and is familiar with the project site; and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of afore-referenced project, all in accordance with the Contract Documents dated August 20, 2019 prepared by Williamson Group Architects and PlanNorth Architectural Co.

BASE BID: For all work required by the Contract Documents in Base Bid, the lump sum of

_____ **AMOUNT WRITTEN IN WORDS (SHALL GOVERN)**
_____ **DOLLARS (\$_____).**
AMOUNT IN FIGURES

CONSTRUCTION DURATION: Number of calendar days from date of commencement to
substantial completion _____ **(DAYS)**

BIDDER hereby acknowledges that he, if awarded the contract, will comply with the insurance requirements established in the Sample Contract. The Sample Contract is available upon request.

ALTERNATES: For each alternate listed in the Contract Documents, state the Alternate Amount.

A. ALT. NO. 1: Coordination Complex Natural Gas Generator (CC Genset)
This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide for the 150kW genset, ATS and associated work.

In the Amount of:
_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

B. ALT. NO. 2: Existing Building Natural Gas Generator (EB Genset)
This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide 100kW genset, ATS and associated work.

In the Amount of:
_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

C. ALT. NO. 3: Rainwater Harvesting System
This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide rainwater collection tanks, associated equipment, and allowance.

In the Amount of:
_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

D. ALT. NO. 4: Interior wood handrails at Corridors
This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide for the provide interior wood handrail, wall brackets & Blocking.

In the Amount of:
_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

E. ALT. NO. 5: Bullet resistant window and partition at reception 143
This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide bullet resistant glass unit and 1/2" steel plate.

In the Amount of:
_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

F. ALT. NO. 6: Motorized Roller Shades
This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide motorized roller shades at rooms 101 & 102.

In the Amount of:
_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

G. ALT. NO. 7: Monument Sign

This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide for the monument sign in island near front entrance.

In the Amount of:

_____ Dollars (\$) _____
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

UNIT PRICES:

A. Unit Price No. 1: ADD/ DELETE 120V Duplex Receptacle

01 To include Outlet, Coverplate, Electrical box, and 3/4" Conduit/Wiring necessary to the nearest circuit.

In the Amount of: _____ Dollars _____
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

B. Unit Price No. 2: ADD / DELETE DATA PORT

01 To include Electrical box, blank coverplate, 3/4" conduit to access above ceiling and a pull string.

In the Amount of: _____ Dollars _____
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

C. Unit Price No. 3: ADD / DELETE 100 CY of Select Fill

01 To include remove 100CY (Tight CY) of onsite soils, replace with select fill, compacted and moisture conditioned per foundation specifications.

In the Amount of: _____ Dollars _____
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

CONTRACT TIME: Bidder agrees, if awarded the Contract, to commence work under this Contract within the time specified from the date of written "Notice to Proceed" and to fully complete all Work required by the Contract Documents or within the time as extended as stipulated in the Contract Documents.

REJECTION OF BIDS: Bidder understands that the Owner reserves the right to reject any or all bids, to accept or reject any Alternates(s) or combination(s) of Alternates, to waive any informality or irregularity in bidding, and to accept any bid which, in the Owner's judgment, is in the Owner's own best interest.

WITHDRAWAL OF BID: Bidder agrees that this Bid shall be good and may not be withdrawn for a period of sixty (60) calendar days after the date and time scheduled for receipt of Bids.

NOTIFICATION, EXECUTION and COMPLETION: Upon receipt of the Notice of Acceptance of this bid, the Bidder will execute the formal Contract. The Work shall commence within 10 days of the date of issuance of the Notice to Proceed and shall be completed within the Contract time as stated above.

Undersigned certifies that amounts contained in this Bid have been carefully checked and are submitted as correct and final.

Bidder's Firm Name: _____

Organization Type: _____
Corporation/Partnership/Proprietorship, etc.;
and, if incorporated, state of incorporation

By (Signature): _____

Printed Signature: _____

Title: _____

Legal Address: _____

Telephone: _____

ATTEST (if Bidder
CORP. _____

is a corporation): **Signature of Corporate Secretary**

3.11 Suspension and Debarment Certification Form

**CERTIFICATION REGARDING
DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS
PRIMARY COVERED TRANSACTIONS**

This certification is required by the regulations implementing Executive Order 12549 and 12689, Debarment and Suspension, 2 C.F.R. part 180, 2 C.F.R part 1200, 2 C.F.R. § 200.213, and 2 C.F.R. part 200 Appendix II (I).

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON NEXT PAGE)

The prospective primary Respondent/Contractor certifies to the best of its knowledge and belief that it and its principals:

- (a) Are not presently debarred, suspended, proposed for disbarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- (b) Have not within a three-year period preceding this application been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
- (d) Have not within a three-year period preceding this application had one or more public transactions (Federal, State, or local) terminated for cause or default.

Where the prospective primary Respondent/Contractor is unable to certify to any of the statements in this certification, such prospective primary participant shall attach an explanation to this proposal.

DATE: _____

SIGNATURE: _____

NAME / TITLE: _____

RESPONDENT/

CONTRACTOR: _____

INSTRUCTIONS FOR CERTIFICATION

By signing and submitting this proposal, the Respondent/Contractor is providing the certification set out below.

1. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The Respondent/Contractor shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the Owner's determination whether to enter into this transaction. However, failure of the Respondent/Contractor to furnish a certification or an explanation shall disqualify such person from participation in this transaction.
2. The certification in this clause is a material representation of fact upon which reliance was placed when the Owner determined to enter into this transaction. If it is later determined that the Respondent/Contractor knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the Owner may terminate this transaction for cause or default.
3. The Respondent/Contractor shall provide immediate written notice to the Owner to which this proposal is submitted if at any time the Respondent/Contractor learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "bid," "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549 and 12689. You may contact the Owner to which this proposal is submitted for assistance in obtaining a copy of those regulations (2 C.F.R. part 180, 2 C.F.R. part 1200, 2 C.F.R. § 200.213 and 2 C.F.R. part 200 Appendix II (I)).
5. The Respondent/Contractor agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a Subcontractor who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the Owner entering into this transaction.
6. The Respondent/Contractor further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion- Lower Tier Covered Transactions," provided by the Owner entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a Respondent/Contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
8. Except for transactions authorized under paragraph 6 of these instructions, if a Respondent/Contractor in a covered transaction knowingly enters into a lower tier covered transaction with a Subcontractor who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the Owner may terminate this transaction for cause or default.
9. The Respondent/Contractor also agrees to include these requirements in each subcontract, or a lower tier covered transaction, exceeding \$25,000 financed in whole or in part with Federal assistance provided by FTA.

3.12 Delinquent State Business Tax Certification

All Offerors shall certify that Offerors is not delinquent in a tax owed the state under Chapter 171, Tax Code, pursuant to the Texas Business Corporation Act, Texas Statutes, Article 2.45.

DATE: _____

SIGNATURE: _____

NAME / TITLE: _____

RESPONDENT/
CONTRACTOR: _____

3.13 Offer

RFP #BTD-CCC2019

By execution below Offeror hereby offers to furnish equipment and services as specified in BTD's RFP # BTD-CCC2019 including any addendums that have been issued, and guarantees that the product offered will meet or exceed specifications in this RFP.

Offeror certifies that it has read all of the offer documents and agrees to abide by all of the federal clauses, terms, certifications, and conditions thereof.

The Offeror agrees that the bid pricing will remain valid for a period of not less than sixty (60) days from the date of submission; and

The submitted bid includes all pricing needed for award and that no further options will be needed upon award.

Authorized Signature

Legal Company Name (print)

Name and Title (print)

Date

Address

City, State & Zip

Telephone

E-mail

Tax ID # or SSN

3.14 PTN-130

RFP #BTD-CCC2019

Please go to the TxDOT Website link below and print off the PTN-130 (Vendor Consolidated Certification Form) and complete it.

<http://www.txdot.gov/inside-txdot/forms-publications/forms/public-transportation.html>

3.15 Lobbying Certification

RFP #BTD-CCC2019

The Contractor certifies, certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form--LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, et seq.)]
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. § 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such expenditure or failure.]

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. A 3801, et seq., apply to this certification and disclosure, if any.

Authorized Signature

Company Name (print)

Name and Title (print)

Date

Section 4 Required Federal Clauses

4.1 Access

Where the Purchaser is not a State but a local government and is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 C. F. R. 18.36(i), the Contractor agrees to provide the Purchaser, the FTA Administrator, the Comptroller General of the United States or any of their authorized representatives access to any books, documents, papers and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions. Contractor also agrees, pursuant to 49 C. F. R. 633 to provide the FTA Administrator or his authorized representatives including any PMO Contractor access to Contractor's records and construction sites pertaining to a major capital project, defined at 49 U.S.C. 5325(a)1, which is receiving federal financial assistance through the programs described at 49 U.S.C. 5307, 5309 or 5311.

Where any Purchaser which is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 U.S.C. 5325(a) enters into a contract for a capital project or improvement (defined at 49 U.S.C. 5302(a)1) through other than competitive bidding, the Contractor shall make available records related to the contract to the Purchaser, the Secretary of Transportation and the Comptroller General or any authorized officer or employee of any of them for the purposes of conducting an audit and inspection.

The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

The Contractor agrees to maintain all books, records, accounts and reports required under this contract for a period of not less than three years after the date of termination or expiration of this contract, except in the event of litigation or settlement of claims arising from the performance of this contract, in which case Contractor agrees to maintain same until the Purchaser, the FTA Administrator, the Comptroller General, or any of their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto. Reference 49 CFR 18.39(i)(11).

The Recipient agrees to require its third-party contractors and third party Subcontractors, at as many tiers of the Project as required, to provide to the U.S. Secretary of Transportation and the Comptroller General of the United States or their duly authorized representatives, access to all third-party contract records to the extent required by 49 U.S.C. § 5325(g). The Recipient further agrees to require its third-party Contractors and third party Subcontractors, at as many tiers of the Project as required, to provide sufficient access to third party

procurement records as needed for compliance with Federal regulations or to assure proper Project management as determined by FTA.

4.2 Bonding Requirements

A bid guarantee from each Offeror equivalent to five (5) percent of the bid price. The "bid guarantee" shall consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the Offeror will, upon acceptance of his bid, execute such contractual documents as may be required within the time specified;

A performance bond on the part of the Contractor for 100 percent of the contract price. A "performance bond" is one executed in connection with a contract to secure fulfillment of all the Contractor's obligations under such contract; and

A payment bond on the part of the Contractor. A payment bond is one executed in connection with a contract to assure payment, as required by law, of all persons supplying labor and material in the execution of the work provided for in the contract. Payment bond amounts determined to adequately protect the federal interest are as follows:

- (1) Fifty percent of the contract price if the contract price is not more than \$1 million;
- (2) Forty percent of the contract price if the contract price is more than \$1 million but not more than \$5 million; or
- (3) Two and a half million dollars if the contract price is more than \$5 million.

A Grantee may seek FTA approval of its bonding policy and requirements if they do not comply with these criteria.

4.3 Clean Air Act and Federal Water Pollution Control Act

The Contractor agrees to comply with all applicable standards and to comply with the inspection and other applicable requirements of:

- (1) Section 306 of the Clean Air Act, as amended, 42 U.S.C. § 7414, and other applicable provisions of the Clean Air Act, as amended, 42 U.S.C. §§ 7401 through 7671q; and
- (2) Section 508 of the Clean Water Act, as amended, 33 U.S.C. § 1368, and other applicable requirements of the Clean Water Act, as amended, 33 U.S.C. §§ 1251 through 1377.

The Contractor agrees to report each violation to the Purchaser and understands and agrees that the Purchaser

will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office. The Contractor also agrees to include these requirements in each subcontract exceeding \$100,000 financed in whole or in part with Federal assistance provided by FTA.

4.4 Civil Rights

Federal Equal Employment Opportunity (EEO) Requirements. These include, but are not limited to:

- Nondiscrimination in Federal Public Transportation Programs. 49 U.S.C. Section 5332, covering projects, programs, and activities financed under 49 U.S.C. Chapter 53 prohibits discrimination on the basis of race, color, creed, national origin, sex, or age, and prohibits discrimination in employment or business opportunity.

- Prohibition Against Employment Discrimination. Title VII of the Civil Rights Act of 1964, as amended, 42 U.S.C. Section 2000e, and Executive Order No. 11246, "Equal Employment Opportunity," September 24, 1965, as amended by Executive Order No. 11375, October 13, 1967, that prohibit discrimination in employment on the basis of race, color, religion, sex, or national origin.

Nondiscrimination on the Basis of Sex. Title IX of the Education Amendments of 1972, as amended, 20 U.S.C. Sections 1681 *et seq.* and implementing Federal regulations, "Nondiscrimination on the Basis of Sex in Education Programs or Activities Receiving Federal Financial Assistance," 49 CFR Part 25 prohibit discrimination on the basis of sex.

Nondiscrimination on the Basis of Age. The "Age Discrimination Act of 1974, as amended, 42 U.S.C. Sections 6101 *et seq.*, and Department of Health and Human Services implementing regulations, "Nondiscrimination on the Basis of Age in Programs or Activities Receiving Federal Financial Assistance, 45 CFR Part 90, prohibit discrimination by participants in federally assisted programs against individuals on the basis of age. The Age Discrimination in Employment Act (ADEA), 29 U.S.C. Sections 621 *et seq.*, and Equal Employment Opportunity Commission (EEOC) implementing regulations, "Age Discrimination in Employment Act," 29 CFR Part 1625, also prohibit employment discrimination against individuals on the basis of age.

Federal Protections for Individuals with Disabilities. The Americans with Disabilities Act of 1990, as amended (ADA), 42 U.S.C. Sections 12101 *et seq.*, prohibits discrimination against qualified individuals with disabilities in programs, activities, and services, and imposes specific requirements on public and private public and private entities. Third party contractors must comply with their responsibilities under Titles I, II, III, IV, and V of the ADA in employment, public services, public accommodations,

telecommunications, and other provisions, many of which are subject to regulations issued by other Federal agencies.

The Common Grant Rules require that third party construction contracts include provisions ensuring compliance with DOL regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 CFR Chapter 60, which implement Executive Order No. 11246, "Equal Employment Opportunity," September 24, 1965, as amended by Executive Order No. 11375, "Amending Executive Order No. 11246 Relating to Equal Employment Opportunity," October 13, 1967.

4.5 Disadvantaged Business Enterprises

This contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs. The national goal for participation of Disadvantaged Business Enterprises (DBE) is 10%. The agency's overall goal for DBE participation is 5.37%. A separate contract goal has not been established for this procurement.

The Contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this DOT-assisted contract. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as BTD deems appropriate. Each subcontract the Contractor signs with a Subcontractor must include the assurance in this paragraph (see 49 CFR 26.13(b)).

The successful bidder/Offeror will be required to report its DBE participation obtained through race-neutral means throughout the period of performance.

The Contractor is required to pay its Subcontractors performing work related to this contract for satisfactory performance of that work no later than 10 days after the Contractor's receipt of payment for that work from BTD. In addition, the Contractor may not hold retainage from its Subcontractors.

The Contractor must promptly notify BTD, whenever a DBE Subcontractor performing work related to this contract is terminated or fails to complete its work, and must make good faith efforts to engage another DBE Subcontractor to perform at least the same amount of work. The Contractor may not terminate any DBE Subcontractor and perform that work through its own forces or those of an affiliate without prior written consent of BTD.

BTB requires prime Contractors to send to BTB copies of checks payable from our Contractors to their vendors. The purpose of our receiving copies of their vendor checks is

to verify they are adhering to our contract which stipulates payment to their vendors within 10 days of receipt of payment from us. In order for us to be able to confirm our Contractors receipt of our payment, we will also need to include that our payments to Contractors will either be sent via Fed-X or wired directly to the Contractor.

4.6 Employee Protections

Construction Activities. BTD agrees to comply, and assures the compliance of Contractor and each subrecipient at any tier of the Project, with the following laws and regulations providing protections for construction employees:

- **Prevailing Wages.** Under 49 U.S.C. Section 5333(a), Davis-Bacon Act prevailing wage protections apply to laborers and mechanics employed on FTA assisted construction, alteration, or repair projects. The Common Grant Rules require third party contracts for construction, alteration, or repair at any contract tier exceeding \$2,000 to include provisions requiring compliance with the Davis-Bacon Act, 40 U.S.C. Sections 3141 *et seq.*, and implementing DOL regulations "Labor Standards Provisions Applicable to Contracts Governing Federally Financed and Assisted Construction," 29 CFR Part 5. The Davis-Bacon Act requires that Contractors pay wages to laborers and mechanics at a rate not less than the minimum wages specified in the wage determination made by the Secretary of Labor. The Davis-Bacon Act also requires Contractors to pay wages not less than once a week. The recipient must include a copy of the current prevailing wage determination issued by DOL in each contract solicitation and must condition contract award upon the acceptance of that wage determination. These requirements are in addition to the separate Wage and Hour Requirements addressed in paragraph 2.c(1) of this Chapter IV.
- **Contract Work Hours and Safety Standards Act,** as amended, 40 U.S.C. §§ 3701 *et seq.*, specifically, the wage and hour requirements of section 102 of that Act at 40 U.S.C. § 3702, and implementing U.S. DOL regulations, "Labor Standards Provisions Applicable to Contracts Governing Federally Financed and Assisted Construction (also Labor Standards Provisions Applicable to Non-construction Contracts Subject to the Contract Work Hours and Safety Standards Act)," 29 C.F.R. Part 5; and the safety requirements of section 107 of that Act at 40 U.S.C. § 3704, and implementing U.S. DOL regulations, "Safety and Health Regulations for Construction," 29 C.F.R. Part 1926; and
- **Copeland "Anti-Kickback" Act -** Section 1 of the Copeland "Anti-Kickback" Act, at 18 U.S.C. Section 874, prohibits anyone from inducing, by any means, any person employed on construction, prosecution, completion, or repair of a federally assisted building or work, to give up any part of his or her compensation to which he or she is

otherwise entitled. Section 2 of that Act, at 40 U.S.C. Section 3145, as amended, and implementing DOL regulations, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in part by Loans or Grants from the United States," 29 CFR Part 3, impose record keeping requirement on all third party contracts for construction, alteration, or repair exceeding \$2,000. The Common Grant Rules also requires provisions for compliance with the Copeland "Anti-Kickback" Act, as amended, and implementing DOL regulations.

- **Construction Safety.** The Common Grant Rules require provisions to ensure safety at construction sites so that no laborer or mechanic shall be required to work in surroundings or under working conditions that are unsanitary, hazardous, or dangerous as prohibited by the safety requirements of Section 107 of the Contract Work Hours and Safety Standards Act, 40 U.S.C. Section 3704, and its implementing DOL regulations, "Safety and Health Regulations for Construction," 29 CFR Part 1926. Notably, Section 4104(c) of the Federal Acquisition Streamlining Act of 1994, 40 U.S.C. Section 3701(b)(3)(A)(iii), increased the threshold for construction safety protections to \$100,000 from \$2,000 as set forth in the Common Grant Rules, so that a federally assisted construction contract must exceed \$100,000 before these construction safety requirements apply to that contract.

4.7 Government-Wide Debarment and Suspension

The Contractor shall comply and facilitate compliance with U.S. DOT regulations, "Nonprocurement Suspension and Debarment," 2 C.F.R. part 1200, which adopts and supplements the U.S. Office of Management and Budget (U.S. OMB) "Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," 2 C.F.R. part 180. These provisions apply to each contract at any tier of \$25,000 or more, and to each contract at any tier for a federally required audit (irrespective of the contract amount), and to each contract at any tier that must be approved by an FTA official irrespective of the contract amount. As such, the Contractor shall verify that its principals, affiliates, and subcontractors are eligible to participate in this federally funded contract and are not presently declared by any Federal department or agency to be:

- a) Debarred from participation in any federally assisted Award;
- b) Suspended from participation in any federally assisted Award;
- c) Proposed for debarment from participation in any federally assisted Award;
- d) Declared ineligible to participate in any federally assisted Award;
- e) Voluntarily excluded from participation in any federally assisted Award; or
- f) Disqualified from participation in any federally assisted Award.

By signing and submitting its bid or proposal, the bidder or Offeror certifies as follows:

The certification in this clause is a material representation of fact relied upon by BTB. If it is later determined by BTB that the bidder or Offeror knowingly rendered an erroneous certification, in addition to remedies available to BTB, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment. The Offeror or proposer agrees to comply with the requirements of 2 C.F.R. part 180, subpart C, as supplemented by 2 C.F.R. part 1200, while this offer is valid and throughout the period of any contract that may arise from this offer. The Offeror or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

4.8 Third Parties

The Purchaser and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the Purchaser, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

4.9 Program Fraud and False or Fraudulent Statements or Related Acts

The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.

The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. § 5307, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5307(n)(1) on

the Contractor, to the extent the Federal Government deems appropriate.

4.10 Termination

Termination for Convenience (General Provision) BTB may terminate this contract, in whole or in part, at any time by written notice to the Contractor when it is in the Government's best interest. The Contractor shall be paid its costs, including contract close-out costs, and profit on work performed up to the time of termination. The Contractor shall promptly submit its termination claim to BTB to be paid the Contractor. If the Contractor has any property in its possession belonging to BTB, the Contractor will account for the same, and dispose of it in the manner BTB directs.

Termination for Default (Supplies and Service) If the Contractor fails to deliver supplies or to perform the services within the time specified in this contract or any extension or if the Contractor fails to comply with any other provisions of this contract, BTB may terminate this contract for default. BTB shall terminate by delivering to the Contractor a Notice of Termination specifying the nature of the default. The Contractor will only be paid the contract price for supplies delivered and accepted, or services performed in accordance with the manner or performance set forth in this contract. If, after termination for failure to fulfill contract obligations, it is determined that the Contractor was not in default, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Recipient.

Upon written notice, the Offeror agrees that the Federal Government may suspend or terminate all or any part of Federal assistance if terms of the project agreement are violated, if the Federal Government determines that the purposes of the laws authorizing the Project would not be adequately served by the continuation of Federal assistance for the Project, if reasonable progress on the Project is not made, if there is a violation of the project agreement that endangers substantial performance of the Project, or if the Federal Government determines that Federal assistance has been willfully misused by failing to make appropriate use of Project property. Termination of Federal assistance for the Project will not typically invalidate obligations properly incurred before the termination date to the extent those obligations cannot be canceled. The Federal Government reserves the right to require the refund of the entire amount of Federal assistance provided for the Project or a lesser amount.

4.11 Buy America

The Contractor agrees to comply with 49 U.S.C. 5323(j) and 49 C.F.R. Part 661, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or

the product is subject to a general waiver. General waivers are listed in 49 C.F.R. 661.7, and include final assembly in the United States for 15 passenger vans and 15 passenger wagons produced by Chrysler Corporation, and microcomputer equipment and software. Separate requirements for rolling stock are set out at 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. 661.11. Rolling stock must be assembled in the United States and have a 60 percent domestic content.

A Contractor must submit to the FTA recipient the appropriate Buy America certification with all bids or offers on FTA-funded contracts, except those subject to a general waiver. Responses, bids or offers that are not accompanied by a completed Buy America certification must be rejected as nonresponsive.

With the implementation of the Fixing America's Surface Transportation (FAST) Act, new requirements for domestic content are phased in based on the date of delivery of the rolling stock. The increased domestic content percentage requirement for rolling stock for:

- i. FY16 & FY17 is more than 60% domestic content;
- ii. FY18 & FY19 is more than 65% domestic content; and
- iii. FY20 & beyond is more than 70% domestic content.

For rolling stock purchases for which the average cost of the vehicle is more than \$300,000, the FAST Act allows the cost of steel or iron produced in the U.S. and used in the rolling stock frames or car shells to be included in the domestic content calculation, regardless of whether the frame or car shell is produced in the U.S.

FTA does not require the inclusion of these requirements in subcontracts.

4.12 Lobbying

Contractors who apply for an award of \$100,000 or more shall file the Certification Regarding Lobbying, required by 49 CFR Part 20, New Restrictions on Lobbying, with the Owner. Each Subcontractor shall file the Certification Regarding Lobbying with the Contractor that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352.

The Contractor and Subcontractors shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from Subcontractors to Contractor to BTD. The Contractor agrees to include these requirements in each subcontract exceeding \$100,000 financed in whole or in part with Federal assistance provided by FTA.

The certification regarding Lobbying to be completed by

the Contractor and Subcontractor(s) is provided herein under Certifications and Forms Section.

4.13 Energy Conservation

The Contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

4.14 Interest of Members of, or Delegates to, Congress

No member of, or delegate to, the Congress of the United States will be admitted to any share or part of this Contract or to any benefit arising there from. (41 U.S.C. §22.)

4.15 Prohibited Interest

No member, officer, or employee of BTD or of a local public body during his tenure or one year thereafter will have any interest, direct or indirect, in this Contract or the proceeds thereof.

4.16 Policies for all Tiers

Contractor agrees to comply with the subsections of this Section and agrees to include the following clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that these clauses will not be modified, except to identify the Subcontractor who will be subject to its provisions.

4.17 Federal Changes

Contractor shall at all times comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Master Agreement between Purchaser and FTA, as they may be amended or promulgated from time to time during the term of this contract. Contractor's failure to so comply shall constitute a material breach of this contract.

4.18 Incorporation of FTA Terms

Incorporation of Federal Transit Administration (FTA) Terms - The preceding provisions include, in part, certain Standard Terms and Conditions required by DOT, whether or not expressly set forth in the preceding contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1F are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The Contractor shall not perform any act, fail to perform any act, or refuse to

comply with any BTM requests which would cause BTM to be in violation of the FTA terms and conditions.

4.19 Disputes

Disputes - Disputes arising in the performance of this Contract which are not resolved by agreement of the parties shall be decided in writing by the authorized representative of BTM's President/CEO. This decision shall be final and conclusive unless within ten (10) days from the date of receipt of its copy, the Contractor mails or otherwise furnishes a written appeal to the President/CEO. In connection with any such appeal, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its position. The decision of the President/CEO shall be binding upon the Contractor and the Contractor shall abide by the decision.

Performance During Dispute - Unless otherwise directed by BTM, Contractor shall continue performance under this Contract while matters in dispute are being resolved.

Claims for Damages - Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the party or of any of his employees, agents or others for whose acts he is legally liable, a claim for damages therefore shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

Remedies - Unless this contract provides otherwise, all claims, counterclaims, disputes and other matters in question between BTM and the Contractor arising out of or relating to this agreement or its breach will be decided by arbitration if the parties mutually agree, or in a court of competent jurisdiction within Brazos County, Texas.

Rights and Remedies - The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by BTM or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

4.20 Drug and Alcohol Testing/Use

A contractor providing services involving the performance of safety sensitive activities must comply with 49 U.S.C. Section 5331 and FTA regulations, "Prevention of Alcohol Misuse and Prohibited Drug Use in Transit Operations," 49 CFR Part 655.

4.21 Privacy Act

Contracts Involving Federal Privacy Act Requirements - The following requirements apply to the Contractor and its employees that administer any system of records on behalf of the Federal Government under any contract: The Contractor agrees to comply with, and assures the compliance of its employees with, the information restrictions and other applicable requirements of the Privacy Act of 1974, 5 U.S.C. § 552a. Among other things, the Contractor agrees to obtain the express consent of the Federal Government before the Contractor or its employees operate a system of records on behalf of the Federal Government. The Contractor understands that the requirements of the Privacy Act, including the civil and criminal penalties for violation of that Act, apply to those individuals involved, and that failure to comply with the terms of the Privacy Act may result in termination of the underlying contract.

The Contractor also agrees to include these requirements in each subcontract to administer any system of records on behalf of the Federal Government financed in whole or in part with Federal assistance provided by FTA.

4.22 Seismic Safety

The contractor agrees that any new building or addition to an existing building will be designed and constructed in accordance with the standards for Seismic Safety required in Department of Transportation Seismic Safety Regulations 49 CFR Part 41 and will certify to compliance to the extent required by the regulation. The contractor also agrees to ensure that all work performed under this contract including work performed by a subcontractor is in compliance with the standards required by the Seismic Safety Regulations and the certification of compliance issued on the project.

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SECTION 00 31 00

OWNER PROVIDED DOCUMENTS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

A. Refer to Section 00 21 16 for substitutions.

1.2 COPIES OF SUPPLEMENTARY CONTRACT DOCUMENTS

A. The following Owner provided documents are incorporated by reference.

- 01 Geotechnical Engineering Report
 - a. Entitled: Brazos Transit District Office Building, Nuches Lane
 - b. Prepared by: Terracon Consultants, Inc
 - c. Terracon Project No.: A1165011
 - d. Dated: February 16, 2016

B. The Architect does not guarantee their contents as to accuracy, completeness, or suitability.

C. Copies may be examined at the Architect's office.

D. Boring logs from the above-mentioned soil report(s) are included in the referenced soils report.

END OF SECTION

PROPOSAL FORM

Submit on **your** letterhead in a form exactly as set forth below. Fill in all blanks by printing or typing, except provide actual seal and signatures where indicated.

BID DATE: October 15, 2019 at 2:00pm Base Bid
October 15, 2019 at 3:00pm Alternate Bids

To: Brazos Transit District
1759 N. Earl Rudder Freeway
Bryan, TX 77803

Proposal For: Brazos Transit District New Coordination Complex
2117 Nuches Ln. Bryan, TX 77803

Brazos Transit District
Project No. BTD-CCC2019

BIDDER: _____

BIDDER hereby declares that he has: a) carefully examined the Bidding Documents; b) a clear understanding of the Bidding Documents; c) personally inspected and is familiar with the project site; and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of afore-referenced project, all in accordance with the Contract Documents dated August 20, 2019 prepared by Williamson Group Architects.

BASE BID: For all work required by the Contract Documents in Base Bid, the lump sum of

AMOUNT WRITTEN IN WORDS (SHALL GOVERN)

DOLLARS (\$ _____).
AMOUNT IN FIGURES

CONSTRUCTION DURATION: Number of calendar days from date of commencement to substantial completion _____ (DAYS)

BIDDER hereby acknowledges that he, if awarded the contract, will comply with the insurance requirements established in the Sample Contract. The Sample Contract is available upon request.

ALTERNATES: For each alternate listed in the Contract Documents, state the Alternate Amount.

A. ALT. NO. 1: Coordination Complex Natural Gas Generator (CC Genset)

This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide for the 100kW genset, ATS and associated work.

In the Amount of:

_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

B. ALT. NO. 2: Existing Building Natural Gas Generator (EB Genset)

This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide 100kW genset, ATS and associated work.

In the Amount of:

_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

C. ALT. NO. 3: Rainwater Harvesting System

This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide rainwater collection tanks, associated equipment, and \$7,500 allowance for design/coordination and system requirements.

In the Amount of:

_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

D. ALT. NO. 4: Interior wood handrails at Corridors

This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide for the provide interior wood handrail, wall brackets & Blocking.

In the Amount of:

_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

E. ALT. NO. 5: Bullet resistant window and partition at reception 143

This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide bullet resistant glass unit and ½” steel plate.

In the Amount of:

_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

F. ALT. NO. 6: Motorized Roller Shades

This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide motorized roller shades at rooms 101 & 102.

In the Amount of:

_____ Dollars (\$ _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

G. ALT. NO. 7:

Monument Sign

This Alternate shall establish the amount to be added or deducted to the Base Proposal to provide for the monument sign in island near front entrance.

In the Amount of:

_____ Dollars (\$_____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

UNIT PRICES:

A. Unit Price No. 1: ADD/ DELETE 120V Duplex Receptacle

01 To include Outlet, Coverplate, Electrical box, and 3/4” Conduit/Wiring necessary to the nearest circuit.

In the Amount of: _____ Dollars _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

B. Unit Price No. 2: ADD / DELETE DATA PORT

01 To include Electrical box, blank coverplate, 3/4” conduit to access above ceiling and a pull string.

In the Amount of: _____ Dollars _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

C. Unit Price No. 3: ADD / DELETE 100 CY of Select Fill

01 To include remove 100CY (Tight CY) of onsite soils, replace with select fill, compacted and moisture conditioned per foundation specifications.

In the Amount of: _____ Dollars _____)
AMOUNT WRITTEN IN WORDS (THIS GOVERNS) (AMT. IN FIGURES)

CONTRACT TIME: Bidder agrees, if awarded the Contract, to commence work under this Contract within the time specified from the date of written “Notice to Proceed” and to fully complete all Work required by the Contract Documents or within the time as extended as stipulated in the Contract Documents.

REJECTION OF BIDS: Bidder understands that the Owner reserves the right to reject any or all bids, to accept or reject any Alternates(s) or combination(s) of Alternates, to waive any informality or irregularity in bidding, and to accept any bid which, in the Owner’s judgment, is in the Owner’s own best interest.

WITHDRAWAL OF BID: Bidder agrees that this Bid shall be good and may not be withdrawn for a period of sixty (60) calendar days after the date and time scheduled for receipt of Bids.

NOTIFICATION, EXECUTION and COMPLETION: Upon receipt of the Notice of Acceptance of this bid, the Bidder will execute the formal Contract. The Work shall commence within 10 days of the date of issuance of the Notice to Proceed and shall be completed within the Contract time as stated above.

Undersigned certifies that amounts contained in this Bid have been carefully checked and are submitted as correct and final.

Bidder’s Firm Name: _____

Organization Type: _____
Corporation/Partnership/Proprietorship, etc.;
and, if incorporated, state of incorporation

By (Signature): _____

Printed Signature: _____

Title: _____

Legal Address: _____

Telephone: _____

ATTEST (if Bidder is a corporation): _____
Signature of Corporate Secretary

CORP.
SEAL

SECTION 00 52 00

PlanNorth Architectural Co., Williamson Group Architects, Gessner Engineers and Lee Truong Yu Engineers.

WAIVER, RELEASE AND INDEMNITY AGREEMENT

Whereas, Architects / Engineers, has utilized certain electronic CADD files in preparation of drawings for the Project, _____, on behalf Brazos Transit District the "Owner",

Whereas, _____, a Subcontractor/Contractor for _____ or _____, a sub tier contractor to _____ hereafter "Subcontractors" desires to obtain copies on magnetic disk of certain of the Architect/Engineer computer aided drafting (CADD) files consisting of construction drawings for the Project, hereinafter, "Electronic Media," and

Whereas, Architect/Engineers is willing to provide copies for the convenience of Subcontractors only under certain express conditions of understanding, acknowledgment and covenant as hereinafter provided without qualification.

Now therefore, Architect/Engineers and Subcontractor agree as follows:

1. ACKNOWLEDGEMENT AND LIMITATIONS: It is acknowledged that (1) Architect/Engineers instruments of professional serves are the hard copy drawings and specifications issued by Architect/Engineers hereinafter "Instrument", (2) the Electronic Media are not substitutions for said Instruments, (3) differences may exist between said Instruments and the Electronic Media which Architect/Engineers is under no obligation to discover or disclose if known, (4) the Electronic Media may be incompatible with the Subcontractor's software and hardware configurations. In all ways, including those enumerated, Subcontractors accept the Electronic Media "as is" and Architect/Engineers is under no obligation to correct, update for changes, enhance or maintain the Electronic Media for Subcontractors. Architect / Engineers does not represent or warrant that the Electronic Media are complete, free from defects, or accurate now or in the future. It is acknowledged, finally, that no client relationship is created by or through this instrument between Architect / Engineers and Subcontractors.

2. WAIVER AND RELEASE: Subcontractors agree all risk of incomplete, inaccurate, defective and variant information contained in the Electronic Media, and waives, quits, and forever discharges and releases the Owner, the Architect/Engineers and there officers, directors, employees and successors for every claim arising out of or related to any error, discrepancy, inaccuracy, variation or other defect in the Electronic Media, whether or not resulting in whole or in part from an act, error or omission of the Architect/Engineers and whether or not such claim is known or unknown as of the date of this waiver and release.

3. REUSE: The Electronic Media is not reusable for any other project or for additions or extensions of the project identified in the Electronic Media. Architect/Engineers does not authorize release of the Electronic Media to any person or party other than the Subcontractors, and the Subcontractors agree and covenant not to release the Electronic Media to any other party.

4. INDEMNIFICATION: Use of the Electronic Media shall be at the sole risk of the Subcontractors and without liability or legal expense to the Owner or the Architect/ Engineers; further, Subcontractors shall, to the fullest extent permitted by law, defend, indemnify and hold the Owner, the Architect/Engineers and its officers, directors, employees and successors harmless from all claims, damages, including bodily injury or death, losses and expenses, including attorney fees, arising out of or resulting in whole or in part from the use of the Electronic Media.

1 5. DISPUTES: Due to the risk of damage, anomalies in transcription or copying and modification
2 during use by Subcontractors where intended or otherwise, it is agreed the Architect/Engineers archived
3 copy of the Electronic Media, if Architect/Engineers chooses to maintain same shall be conclusive,
4 un rebuttable proof in all disputes over the content of the Electronic Media furnished to Subcontractors by
5 this Agreement.
6

7
8
9 Wherefore, the parties have signed this Release, Waiver and Indemnify Agreement on the
10 _____ Day of _____, 2019.

11
12 ARCHITECT/ ENGINEER:

13
14
15 By: _____

16
17 Title: _____

18
19 Date: _____
20

21
22 CONTRACTOR:

23
24 _____

25
26 By: _____

27
28 Title: _____

29
30 Date: _____
31

32
33 SUBCONTRACTOR:

34
35 _____

36
37 By: _____

38
39 Title: _____

40
41 Date: _____

SECTION 00 73 00

SUPPLEMENTARY CONDITIONS
TO THE
GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

The following supplements modify the “General Conditions of the Contract for Construction”, AIA Document A201, 2007. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect. The “General Conditions” are a part of these documents whether or not they are bound herein.

ARTICLE 1 - CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.3 THE WORK

Add the following sentence to the end of paragraph 1.1.3:

The Work also includes all supplies, skill, supervision, transportation services and other facilities and things necessary, proper or incidental to the carrying out and completion of the terms of the contract and all other items of cost or value needed to produce, construct and fully complete the work identified by the Contract Documents.

Supplement Article 1 with the following paragraphs / subparagraphs:

1.1.8 DESCRIPTION OF PARTIES

The following definitions apply to parties named in Contract Documents:

- 1. Owner: Brazos Transit District
- 2. Architect of Record: Williamson Group Architects
106 East 26th Street
Bryan, TX 77803
- Consulting Architect: PlanNorth Architectural Co.
P. O. Box 2468
Brenham TX 77834
- 3. Civil Engineer: Gessner Engineering
2501 Ashford Dr.
College Station, TX 77840
- 4. Consulting Engineer: LEE TRUONG & YU Engineers, PLLC
MEP
16225 Park Ten Place, Suite 810
Houston TX 77084
- 5. Consulting Engineer: Gessner Engineering
Structural
2501 Ashford Dr.
College Station, TX 77840

1.1.09 ADDENDA

Addenda are written or graphic instruments issued prior to the execution of the Contract, which modify or interpret the bidding documents, including Drawings and Specifications, by additions,

1 deletions, clarifications or corrections. Addenda will become part of the Contract Documents when
2 the Construction Agreement is executed.

3
4 **1.1.10 APPROVED, APPROVED EQUAL, APPROVED EQUIVALENT, OR EQUAL**

5
6 The terms Approved and Approved Equal relate to the substitution of materials, equipment or
7 procedure approved in writing by the Architect.
8

9 **1.1.11 ABBREVIATIONS**

10
11 N.I.C; or Not in contract. Indicating work not to be done by this Contractor
12 By Others; or under this Agreement. By Owner; or Existing.

13
14 ADA Americans with Disabilities Act of 1990
15 ADAAG Americans with Disabilities Act Accessibility Guidelines for Buildings & Facilities
16 AIA American Institute of Architects
17 ACI American Concrete Institute
18 AISC American Institute of Steel Construction
19 AISI American Iron and Steel Institute
20 ASA American Standards Association
21 ASTM American Society for Testing Materials
22 AWSA American Welding Society Code
23 FS Federal Specification
24 NBS National Bureau of Standards
25 NEC National Electrical Code
26 SPR Simplified Practice Recommendation
27 UL Underwriters Laboratories, Inc.
28 AISI American Iron and Steel Institute
29 ANSI American National Standards Institute
30

31 **1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS:**

32
33 Add the following to paragraph 1.2:

34
35 **1.2.4 PRECEDENCE OF THE CONTRACT DOCUMENTS:** The most recent issued Document takes
36 precedence over previous issued forms of the same Document. The order of precedence is as
37 follows with the highest authority listed first.
38

- 39 .1 Amendments to the Agreement
40 .2 The Agreement
41 .3 The Addenda
42 .4 The Supplementary Conditions
43 .5 The General Conditions of the Contract for Construction
44 .6 Drawings, and Specifications shall have equal authority. Should these documents
45 disagree in themselves, the Architect will select the appropriate method for
46 performing the work.
47

48 **1.2.5 RELATION OF SPECIFICATIONS AND DRAWINGS:** The Drawings and Specifications are correlative
49 and have equal authority and priority. Should they disagree in themselves, or with each other, the
50 appropriate method of performing the Work will be made by the Architect.
51

52 **1.2.6 OPTIONAL MATERIALS, BRANDS AND PROCESSES:** When more than one is specified for a particular
53 item of Work, the choice shall be the Contractor's. The final selection of color and pattern will be
54 made from the range available within the option selected by the Contractor, unless the item is
55 specified to match a specific color or sample furnished. Where particular items are specified only

1 products of those named manufacturers are acceptable unless different manufactures are approved
2 by Architect. Certain specified construction and equipment details may not be regularly included as
3 part of the named manufacturer's standard catalog equipment but shall be provided by the
4 manufacturer only to the extent required for the proper functioning of the equipment. Reasonable
5 variations in equipment are expected and will be acceptable. The Architect reserves the right to
6 determine the equality of equipment and materials that deviate from any of the indicated and
7 specified requirements.
8

9 **Supplement Article 1 with the following paragraphs and sub-paragraphs:**

10
11 **1.7 MISCELLANEOUS OTHER DEFINITIONS**

12
13 **1.7.1 ADDENDA, ADDENDUM**

14
15 Documents issued by the Architect prior to execution of the Owner Contractor Agreement that
16 modify or clarify the Proposal/Bidding Documents. The addenda become a part of the Contract
17 Documents
18

19 **1.7.2 CONTRACT TIME**

20
21 The period of time that is established in the Contract Documents for Substantial Completion of the
22 Work. This period of time is subject to authorized adjustments for any delays beyond the
23 Contractor's control.
24

25 **1.7.3 DATE OF AGREEMENT**

26
27 The Date of Agreement will be the effective date stated in the Agreement between owner and
28 contractor.
29

30 **1.7.4 DATE OF COMMENCEMENT OF THE WORK**

31
32 The Date of Commencement of the Work shall be established in the Agreement or Amendments to
33 the Agreement.
34

35 **1.7.5 DATE OF FINAL COMPLETION**

36
37 The Date of Final Completion shall be the date that the punch list items are completed.
38

39 **1.7.6 DATE(S) OF SUBSTANTIAL COMPLETION**

40
41 Projects which are not phased shall have a single date of Substantial Completion. Projects which
42 consist of sequential Alternates shall have a date of Substantial Completion for each phase or
43 campus, as applicable. The Date(s) of Substantial Completion shall be the date or dates when the
44 Work or designated portion thereof is sufficiently complete in accordance with the Contract
45 Documents so that the Owner can utilize the Work for it's intended use.
46

47 **1.7.7 DAY**

48
49 The following days are referenced in the documents:
50

51 .1 Calendar Days: The days of the Gregorian Calendar. The Contract Time is established in
52 Calendar Days and extensions of time granted for any delays beyond the Contractor's
53 control.

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- .2 Holidays: The days officially recognized by the construction industry in this area as a holiday; normally limited to the observance days of New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and the day after, and Christmas Day.
- .3 Regular Work Days: All calendar days except holidays, Saturdays, and Sundays.
- .4 Weather Days: Days when rain, flooding, snow, high winds, wet grounds, or similar circumstances prevent progress of the Work. The Contractor will be entitled to an extension of the Contract Time for the additional time, if any, which results from Weather Days or other delays beyond the Contractor's control.

1.7.8 NOTICE TO PROCEED

A notice that may be given by the Owner, or Architect, to the Contractor that directs the Contractor to start the Work.

1.7.9 PUNCH LIST

A comprehensive list prepared by the Contractor prior to Substantial Completion to establish all items to be completed or corrected. This list may be supplemented by the Owner and / or Owner's Consultants. The punch list (including all supplements by the owner and owners consultants) will be attached to the Certificate for Substantial Completion. Upon completion of final punch list items, the project will be considered finally complete and final payment shall be made by Owner.

1.7.10 UNIT PRICES

A cost for a unit of work as described in the Contract Documents. If accepted, the Owner may add or deduct Unit Price work at the amounts stated. Unit prices accepted by the Owner shall be valid through the completion of the Contract. The owner may elect to reject unit prices prior to executing the Contract. If the unit prices are accepted, they will be incorporated into the Agreement. The Owner may elect to reject the unit prices bid without precluding the right to request Changes in the work as described in Article 7 of the General and Supplementary Conditions.

1.7.11 STRUCTURE OF SPECIFICATIONS

- .1 In the preparation of the Specifications, an effort has been made to segregate the various sections of the specifications under headings, by trade. This is done only for convenience and shall not relieve the Contractor of its responsibility to substantially comply with the Specifications.
- .2 No responsibility, either direct or implied, will be assumed by the Owner or the Architect for omissions or duplications by the Contractor in the completion of the contract due to any alleged error in the arrangement of these specifications.
- .3 The misplacement, addition or omission of any letter, word or punctuation mark shall in no way damage the true spirit, intent, or meaning of these specifications. If there is any question regarding the true intent of the Specifications or Drawings, the question is to be submitted to the Architect, in writing, and the Architect's decision on the matter will be final and binding on all parties.
- .4 Abbreviations of the names of technical organizations and societies whose specifications, standards, or criteria are included by reference or noted by initials. References are the latest editions published prior to the date of the specifications unless otherwise noted.

1.7.12 INTERPRETATIONS OF DETAILS, METHODS, SPECIFICATIONS, ETC.

- .1 The following paragraphs are intended to govern throughout these specifications as though repeated under each separate section. These paragraphs are herein only in order to simplify the specifications and avoid repetition.

- 1 .2 The Contractor shall be responsible for the proper working, workmanship, installation, and
2 appearance of items incorporated into the project
- 3 .3 All manufactured articles, materials and equipment shall be installed in a good and
4 workmanlike manner as determined by generally accepted practices in the area where the
5 project is located.
- 6 .4 The Contractor shall execute each part of the Work in substantial compliance with the
7 Contract Documents. The Contractor and all sub-contractors shall have the qualifications
8 and skill required to complete the work in each of the trades and specialties involved.
9 Where there is any doubt as to the requirements or quality of the work, the Contractor shall
10 secure instruction or clarifications from the Architect, and the Architect's decision or any
11 such matter shall be final.

12
13 **ARTICLE 2 - OWNER**

14
15 **2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER**

16
17 **2.2.1** Add the following:

18
19 **Owner has represented that funds are available and have been authorized for the full contract
20 amount of the Work.**

21
22 Delete paragraph 2.2.5 in its entirety and substitute the following:

23
24 **2.2.5** The Contractor will be furnished, free of charge, Electronic copies of the Drawings and Specifications
25 for execution of the Work, The Architect hereby releases copyright for this purpose.

26
27 **2.4 OWNER'S RIGHT TO CARRY OUT THE WORK**

28
29 Delete paragraph 2.4 in its entirety and substitute the following:

30
31 **2.4** If the Contractor defaults or neglects to carry out the Work in accordance with the Contract
32 Documents and fails with a ten-day period after receipt of written notice from the Owner to
33 commence and continue correction of such default or neglect with diligence and promptness, the
34 Owner may after such ten-day period give the Contractor a second written notice to correct such
35 deficiencies with a three-day period. If the Contractor within such a three-day period after receipt of
36 such second notice fails to commence and continue to correct any deficiencies. In such case an
37 appropriate Change Order shall be issued deducting from payments then or thereafter due the
38 Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and
39 compensation for the Architect's additional services made necessary by such default, neglect or
40 failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior
41 approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to
42 cover such amounts, the Contractor shall pay the difference to the Owner.

43
44 **ARTICLE 3 -CONTRACTOR**

45
46 **3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY THE CONTRACTOR**

47
48 Delete paragraphs 3.2.1, 3.2.2, 3.2.3, and 3.2.4 in their entirety and substitute the following:

49
50 **3.2.1** Contractor shall carefully study and compare the Agreement, Conditions of the Contract, Drawings,
51 Specifications, Addenda, and Modifications and shall within a reasonable time report to the
52 Architect any error, inconsistency, or omission he may discover. Contractor shall not be liable for
53 any damage to Owner for failure to report any error, inconsistency or omission unless the Contractor
54 recognized such error, inconsistency, or omission and knowingly failed to report it to the Architect.

55

1 **3.2.2** The Contractor shall be entitled to additional compensation for the "rework portion" of any
2 additional work unless the additional work was the result of Contractor recognizing an error,
3 inconsistency, or omission and knowingly failing to report it to the Architect.
4

5 **3.2.3** The Contractor shall make a reasonable attempt to interpret the Contract Documents before asking
6 the Architect for assistance in interpretation. The Contractor shall not ask the Architect for
7 observation of Work prior to the Contractor's field superintendent's personal inspection of the Work
8 and his determination that the Work complies with the Contract Documents. The Contractor may
9 arrange meetings prior to commencement of the Work of all major subcontractors to allow the
10 subcontractor to demonstrate his understanding of the Contract Documents to the Architect and to
11 allow the subcontractor to ask for any interpretation he may require.
12

13 **3.2.4** Any design errors or omissions noted by the Contractor shall be promptly reported to the Architect,
14 but it is recognized that the Contractor's review is made in the Contractor's capacity as a Contractor
15 and not as a design professional. The Contractor is not required to ascertain that the Contract
16 Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules
17 and regulations, but any nonconformity discovered by or made known to the Contractor shall be
18 promptly reported to the Architect.
19

20 **3.3 SUPERVISION AND CONSTRUCTION PROCEDURES**

21
22 Add the following paragraphs:
23

24 **3.3.4** The project site is tobacco-free environment. No use of tobacco products will be allowed on the
25 property at any time.
26

27 28 **3.7 PERMITS, FEES AND NOTICES**

29
30 Supplement Paragraph 3.7.1 with the following sub-paragraphs:
31

32 **3.7.1.1** The Owner shall pay directly to the governing authority, the cost of all permanent utility impact
33 fees, capital recovery fees, utility assessments and similar non-construction related fees, unless
34 specifically indicated herein.
35

36 **3.7.1.2** The Owner shall pay all fees to the Texas Department of Licensing and Regulation (TDLR) for
37 document review and project inspections relative to the Elimination of Architectural Barriers Act.
38 The Architect will submit the documents to the TDLR for review and approval.
39

40 **3.7.1.3** The Owner shall be responsible for submitting Contract Documents to the governing authority for
41 the purpose of obtaining required building permits from the City of Bryan, and the regulations of
42 Brazos County, as applicable. Permit document submission will be made at such time that, under
43 normal City / County scheduling, permits shall be available no later than November 1, 2019.
44

45 **3.7.1.4** The Contractor shall be responsible for obtaining all temporary utility connections, tap charges,
46 water meter charges and any other similar fees assessed by jurisdictional authorities having control
47 over this project related to the actual installation of building utilities and services. Temporary power
48 shall be paid for by Owner via existing meter currently onsite.
49

50 **3.7.1.5** The Contractor shall be responsible for obtaining and paying for all City and County Building Permits,
51 plan checking fees and on-site inspection fees. The Contractor shall verify all such costs with the
52 governing authority and include all such costs in the Base Proposal Amount.
53

54 **3.7.1.6** The Contractor shall not be granted any extra compensation for not being able to start construction
55 while awaiting the issuance of a building permit.

1 **3.9 SUPERINTENDENT**

2
3 **3.9.1** Delete in its entirety and substitute the following:

4
5 **3.9.1** The Contractor shall employ a competent superintendant and necessary assistants who shall be in
6 attendance at the Project site during performance of the Work. The Contractor shall not assign any
7 person(s) as Superintendent(s) to whom the Owner or the Architect has made reasonable objection.
8

9 **3.9.2** Delete 3.9.2 in its entirety.

10
11 **3.9.3** Delete 3.9.3 in its entirety.

12
13 **3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**

14
15 Add the following subparagraph:

16
17 **3.12.6.1** If, in the opinion of the Architect, the shop drawings indicated a lack of study and review by the
18 Contractor is incomplete, or indicate an inadequate understanding of the work covered by the shop
19 drawings, prior to submittal to the Architect, the shop drawings will be returned, unchecked, to the
20 Contractor for correction of any / all of these deficiencies for subsequent resubmittal. Additional
21 service charges as outlined in 3.2.4 may be charged by the Architect in this event.
22

23 **3.12.7** Delete in its entirety and substitute the following:

24
25 The Contractor shall perform no portion of the Work for which the Contract Documents require
26 submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the
27 respective submittal has been reviewed by the Architect without request for re-submittal.
28

29 Supplement Article 3 with the following paragraph / subparagraphs:

30
31 **3.19 REPRODUCIBLE RECORD DRAWINGS AND ELECTRONIC DOCUMENTS**

32
33 **3.19.1** At the completion of the project, the contractor shall submit one (1) complete set of drawings with
34 all changes made during bidding and construction, including concealed mechanical, electrical, and
35 plumbing items. Drafting shall be neat and legible.
36

37 **3.20 WAGE RATES**

38
39 **3.20.1** No employee used in this construction may be paid less than the applicable wages rate provided
40 under current versions of the Davis Bacon Act.
41

42 **3.21 ANTITRUST VIOLATIONS**

43
44 **3.21.1** To permit the Owner to recover damages suffered; in antitrust violations, the Owner/Contractor
45 Agreement shall include the following, "Contractor hereby assigns to Owner any and all claims for
46 overcharges associated with the Agreement which are under the antitrust laws of the United
47 States, 15 U.S.C.A., Sec. 1 et.seq. (1973)".
48

49 **ARTICLE 4 - ADMINISTRATION OF THE CONTRACT**

50
51 **4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT**

52
53 **4.2.7** Delete the words "and approve" in the first line of the paragraph.
54

55 **ARTICLE 5 - SUBCONTRACTORS**

1
2 **5.2 AWARD OF SUBCONTRACTORS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK**

3
4 Delete paragraphs 5.2.3 in its entirety and substitute the following:

5
6 **5.2.3** If the Owner or Architect has objection to a person or entity proposed by the Contractor,
7 the Contractor shall propose another to whom the Owner or Architect has no objection.
8 The Contract Sum shall be increased or decreased by the difference in cost occasioned
9 by such change and an appropriate Change Order shall be issued.

10
11 **5.3 SUBCONTRACTUAL RELATIONS**

12
13 Add the following subparagraph:

14
15 **5.3.2** The Drawings and Specifications have been organized to facilitate work required by various trades;
16 however, each Subcontractor shall formulate their bid and provide their respective work based on a
17 complete set of Contract Documents. No allowance for time or cost shall be made by the Owner for
18 a subcontractor who bases their scope of work on a partial set of Contract Documents.

19
20 **ARTICLE 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

21
22 **6.2 MUTUAL RESPONSIBILITY**

23
24 6.2.3 Delete paragraph 6.2.3 in its entirety.

25
26 **ARTICLE 7 - CHANGES IN THE WORK**

27
28 **7.4 MINOR CHANGES IN THE WORK**

29
30 7.4 Delete the words “or extension of the contract time”.

31
32 Supplement to Article 7 with the following paragraphs / sub-paragraphs:

33
34 **7.5 CHANGES FUNDED BY ALLOWANCES**

35
36 7.5.1 Allowances balances may be used to fund changes in the work.

37
38 **ARTICLE 9 - PAYMENTS AND COMPLETION**

39
40 **9.2 SCHEDULE OF VALUES**

41
42 Add paragraph 9.2.2 and subparagraphs as follows:

43
44 **9.2.2** In order to facilitate the review of Applications for Payment, the Schedule of Values shall be
45 submitted on AIA Documents G702 and G703 or other similar forms approved by the Architect. Each
46 application for payment shall be accompanied by a partial release of lien equal to the previous
47 payment made by the Owner.

48
49 **9.8 SUBSTANTIAL COMPLETION**

50
51 **9.8.5** Delete in its entirety and substitute with the following:

52
53 **9.8.5** The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their
54 written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance
55 and completion of the punch list items, the Owner shall make payment of retainage applying to such

1 Work or designated portion thereof. Such payment may be adjusted for Work that is incomplete or
2 not in substantial compliance with the requirements of the Contract Documents.

3
4 **9.10 FINAL COMPLETION AND FINAL PAYMENT**

5
6 **9.10.2** Delete 9.10.2 in its entirety and substitute with the following:

7
8 **9.10.2** Prior to final payment and in addition to other final closeout items specified, the Contractor shall
9 submit in duplicate to the Architect the following completed forms:

- 10
11 01 Contractor's Affidavit of Payment of Debts and Claims, AIA Document G706.(modified)
12 02 Contractor's Affidavit of Release of Liens, AIA Document G706A.(modified)
13 03 Contractors, Subcontractors and suppliers separate Lien Releases on the prescribed forms
14 with signature and notary seal on the same sheet of paper.
15 04 General Contractor's guarantee.
16 05 Subcontractor's guarantees.
17 06 Special extended warranties and guarantees.
18 07 Affidavit from each subcontractor or supplier who furnished material incorporated into the
19 Work stating that no asbestos building materials were used.
20 08 Maintenance and instruction manuals.
21 09 Record Drawings.

22
23 The Owner may accept certain portions of the Work as being complete prior to acceptance of the
24 entire project. If certain areas, phases are accepted by the Owner as being complete, and if the
25 Contractor has completed all of the close-out requirements for final payment of that portion of the
26 Work, then the Owner may release retainage for the area of the Work. Amounts of retainage shall
27 be agreed upon by the Owner and Contractor prior to final acceptance of the pertinent portion of
28 the Work.

29
30 Final payment, constituting the entire unpaid balance of the Contract Sum shall be paid by the
31 Owner to the Contractor upon the completion of the punch list items and receipt of the applicable
32 close-out documents.

33
34 **ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY**

35
36 Add the following paragraphs / subparagraphs:

37
38 **10.5 ASBESTOS, LEAD OR PCBs CONTAINING MATERIALS**

39
40 **10.5.1** The Contractor and each subcontractor, sub-subcontractor and suppliers prior to final payment, shall
41 submit an original notarized statement on their letterhead certifying "to the best of their
42 information, knowledge, and belief asbestos, asbestos containing materials, and PCBs have not been
43 used or incorporated into the Work and lead or lead bearing materials have not been incorporated
44 into potable water systems." For the purpose of definition as used in this statement, the term
45 "potable water systems" includes, but is not limited to, those water systems for drinking fountains,
46 all sinks, showers, bath tubs, residential and commercial kitchen equipment, ice machines, and hose
47 bibs, as applicable to the project.

48
49 **10.5.2** To the best knowledge of the Owner, the Architect and his consultants, no products or materials
50 containing asbestos or polychlorinated biphenyl (PCB) or other toxic substances have been
51 specified for this project. No products or materials containing asbestos or PCB are to be
52 incorporated in this project. In the event the Contractor or his Sub-contractors become aware that
53 any products or materials specified, ordered, scheduled for or already incorporated in the work on
54 this project, contain asbestos, or PCB, the situation shall be reported immediately to the Owner
55 and Architect in writing. An acceptable, equal substitute for the product or material in question

1 shall be proposed by the Contractor and the product or material in question, if already onsite or
2 incorporated in the work, shall be removed from the site immediately and returned to the supplier
3 or manufacturer.
4

5 **ARTICLE 11 - INSURANCE AND BONDS**
6

7 Delete all contents of the Article 11 entitled “Insurance and Bonds” and substitute the following:
8

9 “The insurance contained on Contractor’s certificate of insurance, attached to the Agreement, is
10 hereby accepted by Owner. The Contractor will furnish performance and payment bonds for the
11 project.”
12

13 **ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT**
14

15 Delete subparagraphs 14.3.1, 14.3.2, 14.4.1, 14.4.2, and 14.4.3 in their entirety.
16

17 **ARTICLE 15 - CLAIMS AND DISPUTES**
18

19 **15.1.2** Delete the last sentence of 15.1.2 and replace with the following: “Claims by either party must be
20 initiated prior to final application for payment.”
21

22
23 **END OF SECTION**

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in service throughout the construction period at the other buildings/structures onsite.

C. The existing dispatch/office building will be occupied during the full term of the construction, Contractor to coordinate interruptions with power to these areas with Owner prior to Commencement or Work. Power and Data must remain in service during construction and renovations. Provide owner with means of access to existing buildings during construction.

D. Completion Time: The General Contractor will state the Finish Date in the Proposal.

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SECTION 01 14 00

CONTRACTOR SITE RULES

- A.** No foul language or spitting on floor
- B.** No tobacco products on the project site.
- C.** The possession or use of alcohol or illegal drugs is strictly prohibited.
- D.** No tank tops – workers must be fully clothed.
- E.** No workers with a history of felony convictions or warrants.
- F.** No parking on grass, under shade trees, sidewalks or non-vehicular paved areas.
- G.** The Owner must approve the Contractors’ parking. Do not block access routes of adjacent properties.
- H.** Keep the premises free from accumulation of waste, materials or rubbish caused by the work under this contract at each site. Boxes must be broken down prior to removal from the building.
- I.** Upon completion of the work, and prior to the final inspection, have the premises in a neat and clean condition.

END OF SECTION

1 SECTION 01 21 00

2
3 ALLOWANCES

4
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6 CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

7
8 PART 1 - GENERAL

9
10 1.1 DESCRIPTION

- 11
12 A. Refer to Section 00 21 16 for substitutions.
13 B. The following CASH ALLOWANCES shall be included in the Base Proposal. These sums shall
14 be reconciled per Article 4.8 of the General Conditions.

15
16 1.2 CONDITIONS

- 17
18 A. The Contractor shall include in the Contract Sum all allowances stated in the Contract
19 Documents. These allowances shall cover the net cost of the materials and equipment
20 delivered and unloaded at the site, and all applicable taxes. The Contractor's handling costs
21 on site, labor, installation, overhead, profit and other expenses contemplated for the
22 original allowance shall be included in the Contractor's sum, and not in the allowance. The
23 Contractor shall cause the work covered by these allowances to be performed for such
24 amounts and by such persons as the Architect may direct, but he will not be required to
25 employ persons against whom he makes reasonable objection. If the cost, when
26 determined, is more than or less than the allowance, the Contract sum shall be adjusted
27 accordingly by Change Order, which will include additional handling costs on the site, labor,
28 installation costs, overhead, profit and other expenses resulting to the Contractor from any
29 increase over the original allowance. Owner will not be obligated to pay the cost of any
30 work performed without prior written authorization.
31 B. Unexpended balance of allowance sums shall revert to the Owner in the final settlement of
32 the Contract.

33
34 PART 2 - ALLOWANCES

35
36 2.1 ITEMS

- 37
38 A. CONSTRUCTION CONTINGENCY ALLOWANCE:
39 This sum is funds to be unknown conditions.
40 Allow the sum of \$80,000.00 (Eighty Thousand Dollars)
41
42 B. TESTING ALLOWANCE:
43 This sum is funds for concrete, soil, and steel testing/inspections and any other tests the Owner
44 may approve.
45 Allow the sum of \$ 19,000.00 (Nineteen Thousand Dollars)
46
47 C. TECHNOLOGY ALLOWANCE:
48 This sum is funds for network cabling, wireless access points, and equipment, VOIP phone
49 cabling and equipment, fiber optic cabling and terminations, patch cables, CCTV and
50 Equipment, and Owners Operations software migration related to the Work. **GC to Solicit**
51 **Design/Build proposal for scope of work at a later date. Owner/Architect shall assist with**
52 **programming and scope of each scope listed above.**
53 Allow the sum of \$175,000.00 (One Hundred Seventy Five Thousand Dollars)

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- D. MONUMENT SIGN ALLOWANCE:
This sum is funds for monument signage, Concrete footing, Glulam Timbers and associated electrical work.
Allow the sum of \$23,500.00 (Twenty-Three Thousand Five Hundred Dollars)

- E. FURNISHINGS ALLOWANCE:
This sum is funds for office desks, desk chairs, guest chairs, reception area and board room furnishings. Architect shall coordinate scope, contractor to provide pricing for approval.
Allow the sum of \$115,000.00 (One Hundred Fifteen Thousand Dollars)

- F. APPLIANCES ALLOWANCE:
This sum is funds for residential appliances
Allow the sum of \$7,000.00 (Seven Thousand Dollars)

- G. RAINWATER HARVESTING CONTINGENCY: (**Only applicable to Alternate #3, to be added to alternative bid amount, not included in Base Bid**)
This sum is funds for coordination of the rainwater harvesting system that may be necessary for system to function as intended, electrical connections, misc. piping and equipment, etc.
Allow the sum of \$7,500.00 (Seven Thousand Five Hundred Dollars)

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SECTION 01 23 00

ALTERNATES AND UNIT PRICE

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Bidders for substitutions.

1.2 ALTERNATE PRICES

- A. Contractor shall state, in the spaces provided in the Proposal Form, alternate prices for the work described below. The responsibility of determining quantity of alternates rests with the Contractor. The Base Proposal and Alternates shall include the cost of all supporting elements required, so that no matter what combination of Base Bid and Alternates are accepted, that portion shall be a complete entity in itself. Work for all Alternates shall be in strict accordance with the Specification and applicable work as indicated on the Drawings.
- B. Unless otherwise indicated, scope of work for each alternate shall include material and labor, general conditions and all other costs associated with completing the work described.
- C. Alternates are not listed in the order of priority.
- D. Acceptance of alternates shall be at the sole discretion of the Owner.

1.3 UNIT PRICES

- A. Contractor shall state, in the spaces provided in the Proposal Form, unit prices for the work described below. The same unit price for each item shall be used to either add or delete the described work if / as directed by the Architect during the progress of the Work.
- B. Costs declared for Unit Prices shall be the gross amount used for adjustment, based on the actual quantity of units directed to be adjusted.

PART 2 – DESCRIPTION OF ALTERNATES

- A. **ALTERNATE NO. 1– Coordination Complex Natural Gas Generator (CC Genset)**
This Alternate shall establish the amount to be added to or deducted from the Base Proposal for the Contractor to provide electrical pathways-conductors, new gas main-meter-tap, 100kW genset, 2-100amp ATS, concrete pad, paving patching, electrical connection necessary for function of proposed emergency genset and ATS. Refer to E5.00 for additional information.
- B. **ALTERNATE NO. 2 – Existing Building Natural Gas Generator (EB Genset)**
This Alternate shall establish the amount to be added to or deducted from the Base Proposal for the Contractor to demolish concrete, provide electrical pathways/conductors, new gas main-meter-tap, 100kW genset, 400amp ATS, concrete pad, pavement/patching, electrical connection necessary for function of proposed emergency genset and ATS. Refer to E5.01 for additional information.

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- C. **ALTERNATE NO. 3 – Rainwater Harvesting System**
This Alternate shall establish the amount to be added to or deducted from the Base Proposal for the Contractor to provide rainwater collection tanks, makeup water supply for irrigation, underground and overflow piping to storm sewer, pump for irrigation, filters, flush diverters and wet downspout piping, brake metal covers for downspouts. There is a \$7,500 Allowance to cover design, coordination, and misc. equipment of the system. See Allowance and Bid Form for additional information.

- D. **ALTERNATE NO. 4– Interior wood handrails at Corridors**
This Alternate shall establish the amount to be added to or deducted from the Base Proposal for the Contractor to provide stained interior wood handrail with wall brackets (Rakks #203HR) 48”o.c., blocking, and stained/sealed finish. Base bid to include 1 ¼” metal, painted, handrails with wall supports 48”o.c. in the corridors, blocking for same, shown on the Construction Documents.

- E. **ALTERNATE NO. 5 – Bullet resistant window and partition at reception 143**
This Alternate shall establish the amount to be added to or deducted from the Base Proposal for the Contractor to provide bullet resistant glass unit and ½” steel plate at window Reference 5/A8.01 for alternate elevation. Base bid shall reflect 6/A8.01

- F. **ALTERNATE NO. 6– Motorized Roller Shades**
This Alternate shall establish the amount to be added to or deducted from the Base Proposal for the Contractor to provide motorized roller shades, controls, electrical connection, wiring, pathways, etc. at windows in Lobby 101 and Office 102. Base bid shall not include roller shades, pathways, wiring, etc. at these two rooms.

- G. **ALTERNATE NO. 7 – Monument Sign**
This Alternate shall establish the amount to be added to or deducted from the Base Proposal for the Contractor to provide the monument sign in island near front entrance, including but not limited to, footing, glulam members, Misc. steel, fasteners and plates, lighting and finishing. RE: Structural, eEctrical and Architectural Site plan.

PART 3 – DESCRIPTION OF UNIT PRICES

3.1 GENERAL

- A. For the work described, unit pricing shall be used to determine the additional cost or credit to the contract amount or added to or deducted from the Owner’s Contingency for changes in the scope of work made during the progress of the work as directed by the Architect.
- B. The same price shall be used for adding or deducting from the scope of work.
- C. The following unit prices shall be included on the proposal form and shall be included in the Owner - Contractor Agreement.

3.2 UNIT PRICES – See Proposal Form

- A. Provide unit pricing for the following electrical work:
 - 01 Add / Delete 120V Duplex Rec. On Nearby Circuit

- 1
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- 02 Add / Delete J-Box with 1-1/4" Conduit stubbed to above Ceiling
 - 03 Add/ Delete -remove 100CY (Tight CY) of onsite soils, replace with select fill, compacted and moisture conditioned per foundation specifications.

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SECTION 01 29 73

SCHEDULE OF VALUES

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 for substitutions.
- B. Work Included: Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the work, as specified herein and in other provisions of the Contract Documents.
- C. Related Work:
 - 01 Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use required means to assure arithmetical accuracy of the sums described.
- B. When so required by the Architect, provide copies of the subcontracts or other data acceptable to the Architect, substantiating the sums described.

1.3 SUBMITTALS

- A. Prior to the first Application for Payment, submit a proposed schedule of values to the Architect, as outlined below:
 - 01 Meet with the Architect and determine additional data, if any, required to be submitted.
 - 02 Secure the Architect's approval of the schedule of values prior to submitting the first Application for Payment.

1.4 SCHEDULE OF VALUES

- A. The Schedule of Values shall be broken down into item costs, for each specification section as labor and materials as a minimum. After review by the Architect, the Schedule of Values shall be broken down into further items as required. (See following list.)
- B. Schedule of Values - Items in addition to Specification sections.
 - 01 Mobilization
 - 02 Temporary Facilities
 - 03 Clean Up
 - 04 Building Permit
 - 05 Bonds, Insurance
 - 06 General Contractors Fee
 - 07 Misc. Mechanical Accessories
 - 08 Demolition
 - 09 Rough-In Labor (Electrical, Plumbing, Mechanical)
 - 10 Rough-In Material (Electrical, Plumbing, Mechanical)
 - 11 Finish Labor (Electrical, Plumbing, Mechanical)
 - 12 Finish Material (Electrical, Plumbing, Mechanical)
 - 13 Allowances (each listed separately)

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SECTION 01 31 19

PROJECT MEETINGS

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Bidders for substitutions.
- B. Work Included:
 - 01 Contractor participation in preconstruction conference.
 - 02 Contractor administration of pre-installation conferences and progress meetings.
- C. Related Work:
 - 01 Section 01 32 29 - Notification of Architect Requirements

1.2 PRECONSTRUCTION CONFERENCE

- A. Architect will administer preconstruction conference for execution of Owner-Contractor Agreement, and exchange preliminary submittals.
- B. Architect will administer site mobilization conference at project site for clarification of Owner and Contractor responsibilities, in use of site and for review of administration procedures.

1.3 PRE-INSTALLATION CONFERENCES

- A. Contractor shall convene pre-installation conferences with each sub-contractor prior to commencing work of the sub-contractor.
- B. The purpose of the meeting will be to review the contract documents, submittals, conditions of installation, preparation and installation procedures, and coordinate with related work.
 - 01 It is the responsibility of the contractor / sub-contractor to resolve all unknown issues, unclear issues, coordination issues, and assembly interface issues in order to comply with the requirements of the Contract Documents.
- C. Require attendance includes, but is not limited to the following:
 - 01 Contractor's superintendent
 - 02 Architect's field representative (when necessary)
 - 03 Relative sub-contractor
 - 04 Sub-contractors providing adjacent and / or interfacing work.
 - 05 Other sub-contractors whose work may be affected by the relative sub-contractor.
- D. Pre-installation conferences shall be scheduled a minimum of 48 hours in advance of the meeting unless otherwise agreed to by all parties.

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E. Pre-installation conferences may be scheduled with multiple sub-contractors at the same time to facilitate awareness of related work.

F. The contractor shall keep meeting minutes and distribute to all attendees within three days after the meeting; or sooner if required to facilitate project scheduling.

1.4 PROGRESS MEETINGS

A. Contractor shall schedule and administer all project meetings after mobilization conference throughout progress of the work, at minimum, monthly intervals, plus any special called meetings, and all preinstallation conferences.

B. Contractor shall make physical arrangements for meetings, preside at meetings, record minutes, and distribute copies of minutes within two days to attendees, and those affected by decisions made at meetings.

- C. Required Attendance:
- 01 Contractor's Superintendent
 - 02 Contractor's Project Manager
 - 03 Architect's project Manager
 - 04 Architect's Field Representative
 - 05 Architect's Consultants as appropriate to agenda topics for each meeting.
 - 06 Owner's Representative.

D. The primary purpose of the progress meetings is to update the Owner of the project status, progress, schedule and outstanding issues. It shall not be a venue for resolving issues that can otherwise be resolved between the Contractor and Architect / consultants; unless direct input from the Owner is required.

01 In as much as practical, meetings shall be scheduled on the same day and time each occurrence. Changes in the normal schedule must be agreed to by all parties.

E. Suggested Agenda: Review of work progress, status of progress schedule and adjustments thereto, delivery schedules, submittals, maintenance of quality standards, pending changes and substitutions, and other items affecting progress of work.

1.5 PROGRESS MEETING MINUTES

A. Progress meeting minutes shall be furnished by the Contractor and shall be structured to identify all discussion topics and action items by the initiating meeting and the eventual outcome.

B. Meeting minutes shall be produced in a form acceptable to the Architect and shall be similar to the following:

C. Final, the Architect will be asked if he or she has instruction or comments.

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- D. The last meeting shown on the meeting minutes shall relate to the most recent meeting held and shall include **ALL** topics of discussion at that meeting.

- E. Up-to-date meeting minutes shall be furnished to all attendees at the beginning of each meeting.

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SECTION 01 31 23

INTERNET ACCESSED PROJECT MANAGEMENT

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

- A. Substitution of Project Management Extranet Software shall not be allowed.
- B. Internet based project management software is intended to facilitate communication among the entire project team by maintaining a common real-time database of all of the projects records, real-time message tracking and data reporting is available to any authorized project team member through any current internet browser.
- C. The responsibility of documentation of verbal or written requests for information, clarification, reports, logs, or the like, lies with the person who originated the request. Each request shall be posted to the project website in effort to maintain documentation in one central database.

PART 2 - APPROVED INTERNET APPLICATION SERVICE PROVIDER (ASP)

- A. Extranet application service provider shall be the following (no substitution)
Basecamp, LLC
www.basecamp.com

PART 3 – SCOPE & REQUIREMENTS

- A. Project Management Application is an Internet-Accessed Centralized Database of project information and consists of several separate modules or master file divisions for ease of organization. Examples of available file divisions are as follows:
Correspondence, Reports, RFI's, Transmittals, Submittals, Meetings, Documents, Drawing Log, Punch Lists, Reports, Project Photos, Project Team and Schedule of Values.
- B. Contractor will receive free access to Basecamp from the Architect. Each major team member for the contractor (ie project manager, superintendent, etc.) must have a separate user name. Each user shall remain active for the duration of the project. General Contractor shall insure that all major team members on this project have Internet access available during the duration of this project.
- C. Application 'APP' available for IOS and Android smartphone.

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SECTION 01 32 16

CONSTRUCTION SCHEDULE

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 for substitutions.

1.2 SUBMITTALS

- A. Schedules:
- 01 Preliminary Analysis: Within fourteen days after receipt of Notice to Proceed, submit a preliminary construction schedule for review.
 - 02 Construction Schedule: Within four weeks after receipt of Notice to Proceed, submit one reproducible and four prints of the construction schedule.

1.3 RELIANCE UPON SCHEDULE

- A. The construction schedule as approved by the Architect will be an integral part of the Contract, and will establish conditions for various activities and phases of construction.

PART 2 - PRODUCTS

2.1 CONSTRUCTION SCHEDULE

- A. Diagram: Graphically show the order of all activities necessary to complete the work and the sequence in which each activity is to be accomplished.
- B. Activities shown on the diagram shall include, but not necessarily be limited to:
- 01 Project mobilization.
 - 02 Submittals and approvals of shop drawings and samples.
 - 03 Phasing of construction.
 - 04 Procurement of equipment and critical materials.
 - 05 Fabrication and installation of special material and equipment.
 - 06 Final clean up.
 - 07 Final inspection and testing.

2.2 CONSTRUCTION SCHEDULE LIMITATIONS

- A. Work performed under this Contract shall be performed in accordance with the following paragraphs so that the Owner can accept the project as substantially complete as noted below.
- B. All work may proceed immediately upon Notice to Proceed and continue uninterrupted except as follows:
- 01 Maintain power and data connections to the existing buildings onsite as Owner will continue to occupy and operate from these spaces.
 - 02 Substantial Completion

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- C. Certificates of Substantial Completion will be issued for any of the above-mentioned areas of work which are complete prior to the completion of the entire project.

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SECTION 01 32 29

NOTIFICATION OF ARCHITECT REQUIREMENTS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

- A. Refer to Section 00 23 16 for substitutions.
- B. In general, the Contractor shall notify the Architect and / or Architect's Consultants whenever there is need of clarification of interpretation of the Contract Documents.
- C. The Contractor shall notify the Architect (and / or Architect's Consultant) 48 hours in advance of certain stages of construction. The Project Superintendent shall notify the Architect's Field Representative on a regular basis of the ongoing work. These stages shall include, but not necessarily be limited to the following:
 - 01 Excavation and placing (of each lift of) select fill material (notify Testing Lab)
 - 02 Inspection and covering of any underground site utilities (also notify Civil Engineer)
 - 03 Drilling of footings and excavation of grade beams (also notify Structural Engineer)
 - 04 Placing of all concrete (notify Testing Lab & Structural Engineer)
 - 05 Installation of masonry
 - 06 Completion of Erection of Structural Steel (also notify Structural Engineer)
 - 07 Concealment of flashing
 - 08 Concealment of insulation
 - 09 Roofing and sheet metal work
 - 10 Installation of building and glazing sealants.
 - 11 Installation of ceiling grid (also notify MEP Engineer)
 - 12 Installation of each type of finish flooring
 - 13 Painting and staining (each coat)
 - 14 Completion of roughing-in of plumbing, heating, air conditioning and electrical work prior to concealment. (Also notify MEP Engineer)
 - 15 Installation of all electrical fixtures (also notify MEP Engineer)
 - 16 Installation of heating, ventilating and air conditioning (also notify MEP Engineer)
 - 17 Installation of plumbing fixtures (also notify MEP Engineer)
 - 18 Any and all testing specified for equipment, mechanical, electrical and plumbing systems (also notify MEP Engineer)
- D. In addition to notifying the Architect, the General Contractor shall also notify the Structural Engineer (48 hours) prior to the following stages:
 - 01 Drilling and placing the first footings.
 - 02 Pouring the first grade beams.
 - 03 Structural steel framing completion.

PART 2 - PROJECT MEETINGS

2.1 PRECONSTRUCTION CONFERENCE

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A. The Contractor shall contact the Architect at least ten (10) days prior to commencing construction, in order to schedule a preconstruction meeting with the Architect and Owner. This meeting must occur prior to commencement of any construction.

2.2 PROGRESS MEETINGS

A. Contractor shall schedule and administer project meetings throughout progress of the work.

B. Contractor shall make physical arrangements for meetings, preside at meetings, record minutes, and distribute copies within two (2) days to the Architect, participants, and those affected by decisions made at meetings.

C. Required Attendance: Job Superintendent, Project Coordination, Owner and Architect as appropriate to agenda topics for each meeting.

D. Suggested Agenda: Review of work progress, status of progress schedule and adjustments thereto, delivery schedules, submittals, maintenance of quality standards, pending changes and substitutions, and other items affecting progress of work.

2.3 PREINSTALLATION CONFERENCES

A. For each individual Specification section or each subcontractor, convene a preinstallation conference prior to commencing work of that Section.

B. Require attendance of entities directly affecting or affected by work of that section.

C. Review conditions of installation, preparation and installation procedures, and coordinate with related work.

D. Notify Architect and/or Consultants of resulting Requests for Information generated during the preinstallation conference.

END OF SECTION

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SECTION 01 33 00

SUBMITTALS

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Bidders for substitutions.
- B. Refer to General Conditions (AIA A201-2007) and Supplementary Conditions, Section 00 73 00.

1.2 QUALITY ASSURANCE

- A. It is the responsibility of the contractor / sub-contractor / material supplier to provide materials and work that conforms to the requirements of the Contract Documents.
- B. The function of the submittal process is to provide the contractor / sub-contractor / material supplier additional review / quality control of the materials / work proposed to be furnished for the Work.
- C. Prior to delivery to the Architect or Consultant, each submittal shall be thoroughly reviewed by the party / sub-contractor generating the submittal, as well as the General Contractor.
 - 01 Each reviewer shall document their review by affixing a stamp and signature, or a signed review cover sheet to each submittal.
 - 02 All corrections shall be clearly noted.
 - 03 The Contractor shall determine whether the submittals are suitable to forward to the Architect / Consultant, or return to the originator for revisions and re-submittal.
 - 04 Submittals which do not display (at least) two prior reviews (submitter and general contractor) shall be rejected and returned to the general contractor.
- D. The Architect's / Consultant's review of submittals is only for review of the general conformance with the design concept of the project and general compliance with the information given in the Contract Documents.
 - 01 The Architect's / Consultant's review of submittals shall NOT be construed as approval of the products, assemblies or work being submitted.
 - 02 The Architect / Consultant shall not field verify any information requested on the submittal. That is the responsibility of the Contractor.
- E. Submit only what is proposed to be furnished. Where cut-sheets, etc. also contain information on items not to be furnished, clearly indicate / identify / separate the specific items proposed to be furnished from those which are not proposed to be furnished.
 - 01 Where no such indication is made, it shall be understood the submittal is presenting options to be selected by the Architect / Consultant at no additional cost to the Owner.

- 1 F. Submittals shall be rejected by the Architect / Consultant for any of the following:
- 2 01 Lack of required review stamps / cover sheets.
- 3 02 Apparent / obvious lack of review by the contractor / sub-contractor.
- 4 03 An inordinate amount of revisions already noted by the contractor / sub-
- 5 contractor.
- 6 04 Incomplete or missing information.
- 7 05 Inclusion of other items not proposed to be furnished.
- 8
- 9 G. The Contract Documents in electronic format may be made available to the contractor /
- 10 sub-contractor for use provided the users execute a release form to the Architect /
- 11 Consultant. Refer to Section 00 52 00 for applicable forms to be executed and returned
- 12 the relative party (Architect / Consultant) prior to release of contract documents in
- 13 electronic format.
- 14
- 15 H. All submittals shall be submitted with a cover sheet containing the following information:
- 16 01 Contractor's submittals number
- 17 02 Date of submission and dates of any previous submissions
- 18 03 Project title and Architect's project number
- 19 04 Relative specification section number
- 20 05 Names of Contractor, subcontractor, supplier, and / or manufacturer.
- 21 06 Signed and dated review stamp or comment sheet from the party / sub-
- 22 contractor generating the submittal
- 23 07 Signed and dated review stamp or comment sheet from the General Contractor.
- 24
- 25 I. Resubmission Requirements:
- 26 01 Make any corrections or changes in the submittals required by the Architect or
- 27 Consultant and resubmit until reviewed without rejection or direction for re-
- 28 submittal.
- 29 02 Clearly indicate the re-submittal by a capital "R" suffix to the submittal number
- 30 (i.e. original submittal: XXXXX-R-01, first re-submittal: XXXXX-R-02, etc.).
- 31
- 32 J. Failure to comply with the quality assurance requirements may result in immediate
- 33 rejection without review of the submittal. In such circumstances, no additional time shall
- 34 be granted to the Contractor for resultant delays.
- 35

PART 2 - PRODUCTS

2.1 ELECTRONIC DELIVERY

- 36
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- 40 A. Electronic delivery of paper submittals in PDF format shall be loaded to Basecamp for
- 41 processing by the Architect and/or Consultants.
- 42 01 Provide a single, electronic copy of submittals with all previous review comments
- 43 / mark-ups (submitter and Contractor) via Basecamp Project Management
- 44 software to the Architect / Consultant.
- 45 02 Submittals shall be returned electronically to the General Contractor along with
- 46 review comments sheets / mark-ups.
- 47 03 Quantities retained and distributed shall be the responsibility of each party (i.e.
- 48 Contractor, Architect and / or Consultant).
- 49
- 50 B. Electronic submittals in PDF format shall be made in the same format (size) of the actual
- 51 submittal (i.e. 8-1/2x11, 11x17, 24x36, and / or 30x42).
- 52
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1 **2.2 HARD COPY DELIVERY**

- 2
- 3 A. Samples: submit the quantity required to be returned plus two (2) samples that will be
- 4 retained by the Architect or Architect's Consultant.
- 5 01 Prior to submitting actual samples, deliver documentation of the manufacturer,
- 6 model no. / series / pattern / etc. and color if necessary to the Architect.
- 7 Submission may be waived if Architect already has complete samples of
- 8 materials proposed to be furnished.
- 9
- 10 B. Warranties: submit the quantity of the sample warranty required to be returned plus one
- 11 (1) copy that will be retained by the Architect or Architect's Consultant.
- 12 01 Upon Substantial Completion and as part of the closeout documents, provide
- 13 one (1) fully executed original for the Owner and one (1) copy for the Architect.
- 14
- 15 C. Owner's Record Set of Submittals
- 16 01 The contractor shall maintain a separate set of all final submittals to be delivered
- 17 to the Owner at project closeout.
- 18 02 Submittals shall be organized, in order, by spec section.

19

20 **2.3 MANUFACTURER'S PRODUCT DATA**

- 21
- 22 A. Manufacturer's Product Data: Submit manufacturer's complete printed data on each
- 23 product; including, but not necessarily limited to product cut-sheets, specifications,
- 24 quality references, MSDS sheets, and general information.
- 25
- 26 B. Manufacturer's Installation Instructions:
- 27 01 When work is specified to comply with manufacturer's printed installation
- 28 instructions, submit copies of such instructions, including all requirements as
- 29 they specifically relates to the work required in this Contract.
- 30 03 Submission of generic details that do not depict actual conditions of this project
- 31 shall be rejected.
- 32 03 Contractor shall distribute copies to all parties providing interfacing work to the
- 33 completed installation / assembly.
- 34
- 35 C. Manufacturer's Test Reports: Where applicable, submit test reports and certifications
- 36 demonstrating compliance with the referenced standards and requirements.

37

38 **2.4 SHOP DRAWINGS**

- 39
- 40 A. Shop drawings shall be submitted with sufficient detail to fully describe the work
- 41 included. Partial sets, if submitted without prior approval from the Architect, shall be
- 42 subject to rejection and / or holding until subsequent shop drawings are submitted.
- 43
- 44 B. Details included in shop drawings shall depict actual project conditions related to the
- 45 assembly. Details depicting generic substrates or interfacing work shall be subject to
- 46 rejection.
- 47
- 48 C. All dimensions indicated on the drawings are based on the specific models and
- 49 manufacturers of products, equipment, fixtures and miscellaneous items specified or
- 50 used as a design basis.
- 51 01 If the Contractor uses an approved product by another listed manufacturer
- 52 which is different than the specific model and manufacturer listed in these
- 53 specifications, then the Contractor shall be solely responsible for the

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coordination of any dimensional changes required, including structural, relocation of walls, equipment, fixtures, ceilings and miscellaneous items.
02 When dimensional changes are required in these situations, the Contractor shall submit a proposed modification drawing to the Architect for approval prior to proceeding with the work. All causes and effects of the dimensional change shall be indicated on the Contractor's drawing submittal.

2.5 SAMPLES

- A. Finish Samples: Submit full range of manufacturer's standard colors, textures, and patterns for Architect's selection.
 - 01 Submit samples for selection of finishes in accordance with approved schedule, and in such sequence as to cause no delay in the work or in the work of any other Contractor.
 - 02 Prior to submission of samples, provide all relative information to the Architect, including but not limited to manufacturer, model no., series, patterns, colors, etc. necessary to fully describe materials proposed to be furnished. At Architect's option sample submittals may be waived if Architect already has samples of proposed materials in the interiors library. Coordinate with Architect as required.
- B. Selection of finishes from paper or digital representations shall not be accepted. Samples requiring selection of a color, pattern or similar finish shall be submitted in one of the following methods:
 - 01 Whenever possible, submit actual material product samples (i.e. carpet, aluminum, glass, plastic laminate, sealants, etc.)
 - 02 Paint colors for pre-finished materials shall be submitted on actual samples of substrate materials (i.e. paint on sheetmetal).
 - 03 Manufacturer's standard color wheels or similar shall be acceptable for paint selections for field painted items; however, the Architect may require to see / approve an actual application of paint on the intended material in the field.
- C. Submit samples to illustrate functional characteristics of the product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.
- D. Submittals shall contain:
 - 01 Date of submission and dates of any previous submissions
 - 02 Project title and number
 - 03 Contract identification
 - 04 Names of Contractor, Supplier, Manufacturer
 - 05 Identification of sample, with specification section number
- E. Resubmission Requirements for Samples:
 - 01 Make any corrections or changes in the submittals required by the Architect and resubmit until approved.
 - 02 Submit new samples as required for initial submittal.
- F. Submit the number specified in the respective Specification section; minimum of two, one will be retained by Architect. Reviewed samples may be used in the work if so indicated in the specification section.
- G. Selection of materials, finishes and color selections shall be finalized ONLY after samples of all key items are received. Color selections of key items shall NOT be done piece meal.

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2 **2.6 MANUFACTURER'S CERTIFICATES AND WARRANTIES**

- 3
4 A. Prior, and conditional to Contract Close-Out, provide original copies of all required
5 certificates, warranties and guarantees. Refer to other sections for specific requirements.
6
7 B. Submit required certificates and warranties in duplicate, with original signatures.
8 Documents shall be accompanied by the name of the manufacturer's / guarantor's
9 contact name, address, phone number and fax number.

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11 **PART 3 – EXECUTION**

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13 **3.1 SUBMITTAL COORDINATION**

- 14
15 A. Group or package submittals relative to the assembly, which are dependent upon each
16 other for a thorough review (i.e. doors, frames and hardware).
17 01 Time periods for proper and complete submittal reviews which are contingent on
18 or must be coordinated with separate but related submittals shall begin at the
19 time of the Architect's / Consultant's receipt of the last required submittal.
20 Contractors are urged to group submittals appropriately in this regard.
21
22 B. Finishes and samples shall NOT be selected piecemeal. Selection of finish samples will
23 begin only after receipt of all finish selection samples, including exterior and interior
24 finishes.
25
26 C. No extensions of Contractor Time or Cost shall be allowed due to lack of submittal
27 coordination by the Contractor.
28

29 **3.2 SCHEDULE**

- 30
31 A. The Contractor shall schedule to complete the submittal process within a maximum of
32 sixty (60) days after execution of the Owner – Contractor Agreement.
33
34 B. The Contractor shall formulate and provide a submittal schedule to the Architect within
35 twenty (20) days after execution of the Owner – Contractor Agreement, to allow for
36 proper coordination and scheduling reviews.
37
38 C. In formulating the submittal schedule, the Contractor shall allow the following review
39 periods:
40 01 Architect – allow fourteen (14) calendar days response time, after Architect's
41 receipt, for all submittals made to and reviewed by the Architect.
42 02 Architect's Consultant – Allow fourteen (14) calendar days response time, after
43 Consultant's receipt, for all submittals, which must be reviewed by Architect's
44 Consultants.
45 03 All Consultant submittals shall be returned to the Architect for delivery to the
46 Contractor.
47 04 As a courtesy, (1) One expedited submittal review, of two business days, is
48 allowable per project and may be requested by the General Contractor. The
49 Architect will make reasonable efforts to accommodate the request. Additional
50 request for expedited submittal reviews may be requested at a service fee of
51 \$250.00 per review, and the Architects schedule permits such requests.
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3.3 PROCEDURES

- A. Transmit each item with approved form identifying project, contractor, subcontractor, major supplier; identify pertinent drawing sheet and detail number and specification section number, as appropriate.
- B. Transmit Consultant and Engineering submittals directly to respective Consultant with a copy of the transmittal sent to the Architect.
- C. Sub-Contractor’s / Supplier’s Conveyance to the General Contractor: Each sub-contractor / supplier shall be required to review their own submittal and apply a signed and dated stamp to each submittal certifying review, verification of products, field dimensions, adjacent construction work and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - 01 Receipt of submittals without the sub-contractor / supplier review stamp shall be automatically rejected without review and returned to the General Contractor.
- D. Contractor’s Conveyance to the Architect / Consultant: The Contractor is required to thoroughly review and check all submittals received from sub-contractors / suppliers. Upon completion of review and checking, apply signed Contractor's stamp to each item submitted, certifying that review, verification of products, field dimensions, adjacent construction work and coordination of information is in accordance with the requirements of the work and Contract Documents.
- E. If, in the opinion of the Architect / Consultant, the submittal indicates a lack of study or the contractor’s / sub-contractor’s review is incomplete, or indicate an inadequate understanding of the work covered by the submittal, prior to submission to the Architect / Consultant, the submittal will be returned, unchecked, to the General Contractor for correction of any / all of these deficiencies for subsequent re-submittal. Additional service charges as outlined in Section 01410 may be charged by the Architect / Consultant in this event.
- F. Revise and resubmit submittal as required; identify all changes made since previous submittal.
- G. After review, distribute copies to all concerned parties.
- H. The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of shop drawings, product data, samples or similar submittals until the respective submittal has been reviewed by the Architect / Consultant without request for re-submittal.

3.4 CLAIM NOTIFICATION

- A. If the submitter or contractor issues submittals for which an additional cost is anticipated, the submittal must clearly indicate such cost including all supporting information.
 - 01 Lack of accompanying cost information known at the time of the original submittals shall be grounds for disallowance of such cost.

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- B. Upon return of submittal(s) to the originator of the submittal(s), the submitter shall thoroughly review all mark-ups and / or comments prior to proceeding with the work.

- C. Based on the mark-ups and / or comments returned, the submitter shall have fifteen (15) calendar days to submit a claim notification for additional costs the submitter may feel is warranted by the mark-ups / and or comments of the Architect or Consultant.
 - 01 The fifteen (15) calendar day period shall commence upon Contractor's receipt of the submittal from the Architect.

- D. In the absence of any claim notification within the specified time period, it shall be agreed the submitter shall provide the work in accordance with the Contract Documents and the reviewed submittal at no additional cost.

- E. In the event a claim notification is submitted to the general contractor / construction manager, the submittal process shall not be complete until all such claim notifications have been fully resolved.

END OF SECTION

SECTION 01 42 13

ABBREVIATIONS AND SYMBOLS

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 The following is a list of typical trade organization and industry abbreviations:

11	Acoustical Society of America	ASA
12	Adhesive & Sealant Council, Inc.	ASC
13	Air Conditioning & Refrigeration Institute	ARI
14	Aluminum Association	AA
15	American Association of State Highway Officials	AASHO
16	American Concrete Institute	ACI
17	American Council of Independent Laboratories	ACIL
18	American Hardboard Association	AHA
19	American Hotdip Galvanizers Association	AHGA
20	American Institute of Architects	AIA
21	American Institute of Steel Constructors	AISC
22	American Institute of Timber Construction	AITC
23	American Iron & Steel Institute	AISI
24	American National Standards Institute, Inc.	ANSI
25	American Plywood Association	PA
26	American Society for Testing & Material	ASTM
27	American Society of Civil Engineers	ASCE
28	American Society of Heating, Refrigeration and Air Conditioning Engineers	ASHRAE
29	American Society of Mechanical Engineers	ASME
30	American Subcontractors Association	ASA
31	American Woodworking Institute	AWI
32	American Welding Society	AWS
33	American Wood Preserver's Institute	ASPI
34	Architectural Aluminum Manufacturers Association	AAMA
35	Architectural Woodwork Institute	AWI
36	Asphalt Institute	AI
37	Associated General Contractors of America	AGC
38	Brick Institute of America	BIA
39	Building Research Institute	BRI
40	California Redwood Association	CRA
41	Chain Link Fence Manufacturers Institute	CLFM
42	Concrete Reinforcing Steel Institute	CRSI
43	Construction Specification Institute	CSI
44	Door and Hardware Institute	DHI
45	Facing Tile Institute	FTI
46	Federal Specifications	FS
47	Flat Glass Marketing Association	FGMA
48	Gypsum Association	GA
49	Hardwood Plywood Manufacturers Association	HPMA
50	International Conference of Building Officials	ICBO
51	Joint Sealer Manufacturers Association	JSMA
52	Maple Flooring Manufacturers Association	MFMA
53	Metal Lath Association	MLA

1	National Association of Architectural Metal Manufacturers	NAAMM
2	National Association of Mirror Manufacturers	NAMM
3	National Bureau of Lathing & Plastering	NBLP
4	National Clay Pipe Institute	NCPI
5	National Concrete Masonry Association	NCMA
6	National Electrical Manufacturers Association	NEMA
7	National Environmental Systems Contractors	NESC
8	National Fire Protection Association	NFPA
9	National Forest Products Association	NFPA
10	National Hardware Lumber Association	NHLA
11	National Ornamental Metal Manufacturers Association	NOMMA
12	National Paint, Varnish and Lacquer Association	NPVLA
13	National Ready Mixed Concrete Association	NRMCA
14	National Roofing Contractors Association	NRCA
15	National Society of Professional Engineers	NSPE
16	National Woodwork Manufacturers Association, Inc.	NWMA
17	Painting and Decorating Contractors of America	PDCA
18	Perlite Institute, Inc.	PI
19	Portland Cement Association	PCA
20	Resilient Floor Covering Institute	RFCI
21	Rubber and Vinyl Floor Council	RVFC
22	Southern Building Code Congress	SBC
23	Southern Forest Products Association	SFPA
24	Southern Hardwood Lumber Manufacturing Association	SHLMA
25	Steel Deck Institute	SDI
26	Steel Door Institute	SDI
27	Steel Joist Institute	SJI
28	Steel Structures Painting Council	SSPC
29	Texas Accessibility Standards	TAS
30	Tile Council of America, Inc.	TCA
31	Underwriter's Laboratories, Inc.	UL
32	Venetian Blind Institute	VBI
33	Vinyl Fabrics Institute	VFI
34	West Coast Lumber Inspection Bureau	WCLIB
35	Western Red Cedar Lumber Association	WRCLA
36	Western Wood Products Association	WWPA

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39 **1.2 The following is a list of typical Contract Document abbreviations**

40		
41	Acoustical	ACOUST
42	Air Handling Unit	AHU
43	Alternate	ALT
44	Aluminum	ALUM
45	Bottom	BOT
46	Building	BLDG
47	Cast-In-Place	CIP
48	Centerline	CL
49	Ceramic Tile	CT or CER TILE
50	Concrete	CONC
51	Concrete Masonry Unit	CMU
52	Continuous	CONT
53	Corridor	CORR

1	Diameter	DIA
2	Dimension(s)	DIM or DIMS
3	Door	DR
4	Each	EA
5	Electrical	ELECT
6	Elevation	ELEV
7	Equal	EQ
8	Existing	EXIST
9	Expansion Joint	EJ or EXP JT
10	Exterior	EXT
11	Floor	FL
12	Floor Finish	FF
13	Floor Drain	FD
14	Finish or Finished	FIN
15	Finish Floor	FF or FIN FL
16	Fixture	FIXT
17	Floor	FL
18	Flowline	FL
19	Frame	FR
20	Galvanized	GALV
21	Gauge	GA
22	General Contractor	GC
23	Grade	GR
24	Gypsum Board	GYP BD
25	Handicap	HC
26	Hardware	HW
27	Height	HT
28	Hollow Metal	HM
29	Hot Dipped Galvanized	HD GALV
30	Inside Diameter	ID
31	Insulation	INSUL
32	Interior	INT
33	Lavatory	LAV
34	Light	LT
35	Manhole	MH
36	Manufacturer	MFGR or MFR
37	Marker board	MB
38	Masonry	MAS
39	Material	MATL
40	Match Existing	ME
41	Maximum	MAX
42	Metal	MTL
43	Minimum	MIN
44	Not in Contract / Work by Others	NIC
45	On Center	OC
46	Outside Diameter	OD
47	Overflow Roof Drain	OD or ORD
48	Plastic Laminate	PL or PLAST LAM
49	Radius	RAD
50	Reflected Ceiling Plan	RCP
51	Reinforcing	REINF
52	Reinforced Concrete Pipe	RCP
53	Required	REQ

1	Refer	RE
2	Restroom	RR
3	Roof Drain	RD
4	Roof Top Unit	RTU
5	Room	RM
6	Rough Opening	RO
7	Sanitary Sewer	SAN SWR
8	Schedule	SCHED
9	Sidewalk	SW
10	Similar	SIM
11	Solid Core Plastic Laminate	SCPL
12	Space	SP
13	Stainless Steel	SS
14	Storage	STOR
15	Storm Sewer	STM SWR
16	Suspended Acoustical Ceiling	SAC
17	Tack Board	TB
18	Temporary Bench Mark	TBM
19	Thick	THK
20	Top of Curb	TC or TOC
21	Top of Grate	TG or TOG
22	Top of Steel	TS or TOS
23	Treated	TRTD
24	Typical	TYP
25	Urinal	URIN or UR
26	Vinyl Composition Tile	VCT
27	Vinyl Wall Covering	VWC
28	Water Closet	WC
29	Wood	WD

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END OF SECTION

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SECTION 01 45 23

TESTING SERVICES AND OBSERVATIONS

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 – GENERAL – TESTING LABORATORY SERVICES

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 for substitutions.
- B. The Contractor shall allow in his proposal the coordination and supervision of tests to be performed by an independent laboratory selected by the Owner.
- C. All testing laboratory services shall be provided and paid for by the Owner outside of this Contract or by allowance amount inside this Contract. A testing lab shall be selected by the Owner, and the Contractor shall be notified as soon as possible. Refer to Allowances (Section 01020) for testing allowance amount, if applicable.
- D. The Owner will pay for the initial laboratory services of materials that comply with the requirements of the Contract Documents. The Contractor shall pay for testing and retesting of materials that do not comply with the requirements of the Contract Documents.
- E. The Contractor shall cooperate with the testing laboratory in all matters pertaining to the work. The Owner retains the option to add to or delete any or all testing specified herein.

1.2 RELATED REQUIREMENTS

- A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals, or public authorities.
- B. Respective Sections of Specifications: Certification of products.
- C. Each Specification Section Listed: Laboratory test required and standards for testing.
- D. Testing laboratory inspection, sampling and testing is required for:
 - 01 Section 02200 - Earthwork
 - 02 Section 02220 - Trenching and Backfilling
 - 03 Section 02240 - Soil Stabilization
 - 04 Section 03300 - Cast-In-Place Concrete
 - 05 Section 03311 - Insulating Concrete
 - 06 Section 03410 - Precast Concrete Panels
 - 07 Section 04200 - Unit Masonry
 - 08 Section 05120 - Structural Steel
 - 09 Section 07255 - Sprayed Fireproofing
 - 10 Section 07511 - Built-Up Roofing
 - 11 Section 15056 - Earthwork
 - 12 As requested by the Owner or Architect

1 **1.3 AUTHORITIES AND DUTIES OF THE LABORATORY**

- 2
- 3 A. The laboratory is not authorized to revoke, alter, relax, enlarge, or release any requirement
- 4 of the Specifications, or to approve or accept any portion of the work. When it appears that
- 5 the material furnished or work performed by the Contractor fails to fulfill specification
- 6 requirements, the testing laboratory shall promptly notify the General Contractor,
- 7 Architect, supplier and/or subcontractor providing or preparing the materials or work being
- 8 tested of such deficiencies.
- 9
- 10 B. The laboratory shall promptly distribute copies of the laboratory test and inspection
- 11 reports. Standard distribution shall include copies of all reports to the Owner, Architect, and
- 12 General Contractor. The structural engineer, civil engineer, MEP engineer, concrete
- 13 supplier, and any outside consultants shall receive copies of the testing results regarding
- 14 their particular phase of the project.

15

16 **1.4 TESTING LABORATORY GUIDELINES AND PROCEDURES**

- 17
- 18 A. Technicians scheduled to perform specific testing services must be qualified to review and
- 19 perform other services that overlap (i.e., earthwork, foundation inspections, rebar
- 20 inspection, and concrete), when scheduled concurrently at the project site.
- 21
- 22 B. Technician time for services performed will be reimbursed at a regular time rate.
- 23 Compensation at the overtime rate will be considered for any hours over eight hours spent
- 24 at the job site on a single day, field testing services performed on a Saturday or Sunday, and
- 25 any field services performed on a recognized holiday.
- 26
- 27 C. Concrete design mixes will receive a cursory review with any discrepancies reported to the
- 28 Architect. No compensation will be considered for these reviews.
- 29
- 30 D. Nuclear density testing will be based on a daily rental rate for the actual testing equipment;
- 31 compensation on a per test basis will not be considered.
- 32
- 33 E. Report distribution shall include the Owner, Architect, Contractor, Civil Engineer, Structural
- 34 Engineer, and others requesting or requiring review of the specific testing results.
- 35
- 36 F. There will be a one-hour minimum for each scheduled testing service. Vehicle charges will
- 37 be included on a per day basis.
- 38
- 39 G. Cylinder pick-up will be handled by the technician performing the test on a scheduled pick-
- 40 up day with no technician time or vehicle charge.
- 41
- 42 H. Structural steel inspections shall include a plant visit reviewing shop fabrication, welding
- 43 and an overall review of the shop fabrication quality control standards. Structural steel field
- 44 inspection shall include a 100% visual review of all field fillet welds and initial frequency of
- 45 25% ultrasonic testing of full field penetration welds. There shall be 100% visual review of all
- 46 bolted connections, and a minimum of two (2) bolts tested at every bolted connection.
- 47
- 48 I. The Contractor shall bear the responsibility of scheduling all testing services. The Contractor
- 49 and the testing laboratory shall assume full responsibility to coordinate the testing services.
- 50 Cancellations and/or failed tests will be reimbursable to the Owner by the responsible party
- 51 for the cancellation or failure of a test or service.
- 52
- 53

1 1.5 TESTS CONDUCTED

2
3 A. Earthwork:

- 4 01 Subgrade under building slabs and paving.
5 a. In place density tests for each 500 square yards of existing subgrade
6 material.
7 02 Select earth fill and fill under building slabs and paving.
8 a. Proctor curve for one type of fill material. If the original choice of material
9 does not meet the specifications, the Contractor shall pay for additional
10 testing.
11 b. In place density test for each 500 square yards of compacted new fill
12 material, ASTM D2922 or AASHTO T99.
13 c. Liquid limit of fill material, ASTM D423 or AASHTO T89.
14 d. Plastic limit and plasticity index of all fill material, ASTM D424 or AASHTO
15 T90 and T91.
16 03 Soil Stabilization:
17 a. Various tests relative to the requirements of Texas Highway Department
18 Standard Specification for Construction of Highways, Streets and Bridges.
19 04 References:
20 a. American Society for Testing and Materials
21 ASTM D423
22 ASTM D424-59 (1971), Plastic Limit and Plastic Index of Soils
23 ASTM D698-78, Measure-Weight Relations of Soils and Soil Aggregate
24 using 5.5 lbs. (2-49-KG) Rammer and 12-in. (305 mm) drop.
25 ASTM D2922-71 (1976)
26 b. American Association of State, Highway and Transportation Officials
27 AASHTO T89-76, Determining the Liquid Limit of Soils
28 AASHTO T90-70, Determining the Plastic Limit and Plasticity Index of Soils
29 AASHTO T91
30 AASHTO T99-74, Moisture-Density Relations of Soils
31

32 B. Cast-In-Place Concrete:

- 33 01 Design concrete mixes and test aggregates proposed for use therein.
34 02 Determine the quality of the concrete as outlined in ASTM C-L143.
35 03 Provide full time services for the review of all drilled pier foundation inspections.
36 Including a daily report noting grid lines and locations of each pier drilled. After the
37 foundation shaft has been drilled, the lab shall test an undisturbed sample and
38 verify that it meets or exceeds the design specification.
39 04 Provide full-time services for all structural building concrete drilled piers, grade
40 beams, slab on grade, columns, and other miscellaneous structural concrete.
41 Included within this scope of work is the review of all the rebar placement, size,
42 spacing of stirrups, and miscellaneous placement requirements.
43 05 Testing Lab cast four (4) concrete test cylinders for every 50 cubic yards or fraction
44 thereof, placed on any day for structural concrete and four (4) concrete test
45 cylinders for each 100 cubic yards, or fraction thereof, placed on any day for all
46 other types of concrete. The
47 06 Testing laboratory shall test one (1) cylinder at seven (7) days, two (2) cylinders
48 at twenty-eight (28) days and hold the last cylinder in reserve.
49 07 Strength level of an individual class of concrete shall be considered satisfactory
50 **both** of the following criteria are met:
51 a. The arithmetic average of any three consecutive strength tests equal or
52 exceed f'_c .

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- b. No individual strength test (average of two cylinders) falls below f'_c by more than 500 psi.
- 08 References:
 - a. ASTM C 31/C 31M, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - b. ASTM C 138, Standard Test method for Unit Weight, Yield, and Air Content of Concrete.
 - c. ASTM C 143, Standard Test method for Slump of Hydraulic Cement Concrete
 - d. ASTM C 173, Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
 - e. ASTM C 231, Standard Test method for Air Content of Freshly Mixed Concrete by the Pressure Method.
 - f. ASTM C 1064, Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete.
- C. Structural Steel:
 - 01 Radiographic inspection shall be provided for all welds called for on the drawings as full penetration butt welds. If welds are inaccessible to radiograph, welds shall have ultrasonic inspection.
 - 02 The testing of welded connections indicated on the drawings shall be paid for from the testing laboratory allowance; however, in the event the fabricator obtains approval from the structural engineers for additional welds not shown on the drawings, the cost of testing those additional welds shall be paid for by the Contractor.
- D. Mortar Mix Testing: Provide pre-construction and construction evaluation of mortars per ASTM C780-87.

1.6 TDLR / ADA ACCESSIBILITY

- A. The Owner /Architect shall be responsible for interfacing with Texas Department of Licensing and Registration (TDLR) regarding state approval for compliance with Texas Accessibility Standards.
- B. The Owner /Architect shall make the initial submission of the Contract Documents for review.
- C. TAS review comments affecting the Work shall be incorporated into the Work as directed by the Architect either by Addendum, Change Proposal Request, Minor Change or Clarification.
- D. During the progress of the Work, the Contractor shall bring to the Architect's attention any portion of the Work that may be questionably compliant with TDLR / TAS.
- E. The Architect shall coordinate and manage the TAS inspection of the completed project.
 - 01 TAS required corrective measures due to design issues shall be paid for by the Owner.
 - 02 TAS required corrective issues due to Contractor issues (materials, installation, etc.) shall be paid for by the Contractor.
- F. All corrective work shall be completed within thirty (30) days after notification unless otherwise agreed upon by the Owner.

1
2
3 **PART 2 – GENERAL – GOVERNMENTAL INSPECTIONS AND CONTRACTOR TESTING**
4

5 **2.1 DESCRIPTION**
6

- 7 A. The Contractor shall allow in his Proposal the application, coordination, scheduling and cost
8 of all on-site inspections to be performed by governmental authorities having jurisdiction
9 which are required for approval of the Work and occupancy of the building; including, but
10 limited to all: City departments, all County departments, Flood Control Districts, Municipal
11 Utility Districts, Health Departments and Fire Marshall Offices.
12
13 B. The Contractor shall make all corrective measures in accordance with instructions received
14 from the governing authority inspector having jurisdiction, as required to receive 100%
15 approval for the work being inspected.
16
17 C. The Contractor shall bear all costs for initial inspections, re-inspections and any other
18 expenses related to on-site inspections made by governing authorities.
19
20 D. No allowance shall be made for additional Contract Time, nor an increase in the Contract
21 Sum for any unanticipated expenses or delays resulting from failed governmental
22 inspection or resulting re-inspections required to obtain approval(s).
23

24 **2.2 BELOW SLAB SANITARY SEWER TESTING**
25

- 26 A. In addition to normal industry / governmental testing required for the sanitary sewer
27 system, Contractor shall allow in his Proposal the application, coordination, scheduling and
28 cost to provide a static water test(s) as described below.
29
30 B. The contractor shall perform a static pressure test on all sanitary sewer piping systems
31 below the building slab.
32
33 C. The test(s) shall be maintained continuously from the time the pipe installation is initially
34 tested prior to final cover-up, and continue throughout all foundation preparation and
35 placement of concrete slabs; and terminating a minimum of seven (7) days after the
36 placement of concrete slabs.
37 01 Maintain sealed caps on all stub-ups to prevent dissipation of water within the
38 piping system.
39
40 D. Any failure of the static testing indicating leakage during the above period shall be
41 immediately reported to the Architect, MEP Engineer and Owner.
42
43 E. The Contractor shall be responsible for all corrective measures necessary to repair and / or
44 replace defecting piping as directed by the Architect.
45

46 **PART 3 – GENERAL – PROJECT CONSULTANT OBSERVATIONS**
47

48 **3.1 DESCRIPTION**
49

- 50 A. The Contractor shall allow in his Proposal the coordination and scheduling of Observations
51 to be performed by the Owner’s project consultants; including the Architect, MEP Engineer,
52 Structural Engineer, and Special Systems Consultants as they may apply to this Work.
53

- 1 B. All project consultant observation services shall be performed by designees of the relative
- 2 consultant; upon which the Contractor may rely as to the capability and thoroughness of
- 3 the observation being performed. Upon request by the Contractor, the names of A/E field
- 4 representatives performing specific observations shall be furnished by the Architect.
- 5
- 6 C. The Owner shall pay for the observation services of the project consultants in accordance
- 7 with the Owner – Architect Agreement and the requirements of the Contract Documents.
- 8 Excessive observations and re-observations resulting from the Contractor’s actions as
- 9 described in this section, shall be paid for by the Contractor directly to the affected
- 10 Consultant.
- 11
- 12 D. The Contractor shall cooperate with the Owner’s project consultants in all matters
- 13 pertaining to required observations of the work as described in the Contract Documents.
- 14 The Owner retains the option to add to or delete any or all observations specified herein;
- 15 and thereby accept the relative work without observation.
- 16
- 17 F. Refer to Section 01420 – Notification of Architect Requirements for additional information.
- 18

19 **3.2 RELATED REQUIREMENTS**

- 20
- 21 A. Conditions of the Contract, AIA Document A201, and Supplementary Conditions to the
- 22 General Conditions for the Construction Contract.
- 23
- 24 B. Respective Sections of Specifications describing the required consultant observations.
- 25

26 **3.3 AUTHORITIES AND DUTIES OF THE A/E FIELD REPRESENTATIVES**

- 27
- 28 A. The project consultant representatives are not authorized to revoke, alter, relax, increase,
- 29 or release the Contractor from any requirement of the Contract Documents without written
- 30 notice furnished to the Contractor by the Architect. When it appears that the material,
- 31 assembly or work performed by the Contractor fails to fulfill Contract requirements, the
- 32 project consultant representative shall promptly notify the General Contractor, Architect
- 33 and Owner.
- 34
- 35 B. The project consultant representative(s) shall promptly distribute copies of the observation
- 36 reports. Standard distribution shall include copies of all reports to the Owner, Architect, and
- 37 General Contractor.
- 38

39 **3.4 PROJECT CONSULTANT OBSERVATION GUIDELINES AND PROCEDURES**

- 40
- 41 A. Project Consultants shall make all observations required in the Contract Documents and
- 42 requested by the Contractor and Owner.
- 43
- 44 B. For each material, assembly or phase observation required in the Contract Documents, and
- 45 upon request by the Contractor, the project consultant(s) shall perform the following
- 46 observations as required in the Owner – Architect Agreement:
- 47 01 Initial observation to determine compliance with the Contract Documents.
- 48 02 Observation to determine deficiencies where the initial observation results do not
- 49 show 100% compliance with the Contract Documents. At the consultant’s
- 50 discretion, this observation may be performed concurrent with the initial
- 51 observation.
- 52 03 Re-observation to determine 100% compliance with the Contract Documents.
- 53

1 The above series of observations shall be at the expense of the Owner in accordance with
2 the Owner – Architect Agreement.

3
4 C. In the event the observation series described above does not result in 100% approval of the
5 material, assembly or phase being inspected, all subsequent re-observations required to
6 achieve 100% approval shall be at the sole expense of the Contractor to be paid directly to
7 the project consultant based on the consultant’s standard hourly rates for time expended,
8 including travel to and from the site.

9
10 D. Recognizing the size and complexity of work included in a project may be sufficiently large
11 enough to require the project to be divided into scope areas, each such area shall be
12 considered separate and stand-alone with respect to paragraph 2.4.B above. Requests by
13 the Contractor for project consultant observations of partial scope areas shall be
14 considered observations of the entire scope area with respect to paragraph 2.4.B above;
15 and subsequent observations of the remaining portions of the same scope area shall be
16 paid for directly to the Consultant by the Contractor. Consultants shall invoice the
17 Contractor on a monthly basis, and payment shall be due upon the Contractor’s receipt of
18 the invoice.

19
20 E. The Contractor shall bear the responsibility of requesting and scheduling all project
21 consultant observations required by the Contract Documents. The Contractor shall give the
22 project consultant a minimum of forty-eight (48) hours notice prior to the requested
23 observation. No extension of Contract Time shall be granted for untimely observations due
24 to the Contractor’s failure of proper observation request notification.

25
26 F. Observations voluntarily made by project consultants at their discretion, not specifically
27 requested by the Contractor, shall not count as one of the observations described in
28 paragraph B above, nor shall the Contractor be liable for any related expenses.

29
30 **3-5 PROJECT CONSULTANT OBSERVATIONS**

- 31
32 A. Earthwork
33 B. Site Utilities prior to cover-up.
34 C. Cast-in-place concrete.
35 01 Reinforcing.
36 D. Structural steel.
37 E. Mechanical rough-in prior to cover-up.
38 F. Plumbing rough-in prior to cover-up.
39 G. Electrical rough-in prior to cover-up.
40 H. Above ceiling prior to cover-up.
41 I. Start-up demonstrations of building systems and components.
42 J. Punch lists (treated separately for each consultant). Refer to Specification Section CB,
43 section 9.8.
44 K. Observation / review of O&M Manuals and other close-out documents.
45 L. Observation / review of Record Drawings.
46
47
48

49 **END OF SECTION**

SECTION 01 78 00

GUARANTEES AND CERTIFICATES AND CLOSE-OUT

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GUARANTEES AND CERTIFICATES AND CLOSE-OUT

1.1 DESCRIPTION

A. The Contract requires the General Contractor to warrant ALL materials and work provided / furnished for a period of one (1) year following the date of Substantial Completion. The Contractor shall furnish the general one year warranty in writing to be attached to the Certificate for Substantial Completion. The one year general warranty shall include all labor, material and delivery costs required to correct defective material or installation during the Warranty period.

B. In addition to the General Contractor's one-year warranty, other required guarantees shall be submitted to the Architect in duplicate prior to application for final payment. Unless specified otherwise in their respective sections or below, all guarantees shall be for a period of one year from the date of Substantial Completion as evidenced by the Architect's Certificate of Substantial Completion. All guarantees shall include all labor, material and delivery costs required to correct defective material or installation. Guarantees include but are not limited to:

- 01 Roofing (20 Years No Dollar Limit Total / Non-Prorated Systems Warranty)
- 02 Glazing (2 Years)
- 03 Dampproofing and Waterproofing (2 Years)
- 04 Sealants (2 Years)
- 05 Plastic-faced Wood Doors (life of the doors)
- 06 Painting and Staining (2 Years)
- 07 Carpeting (10 Years)
- 08 Toilet Accessories (2 Years)
- 09 Mechanical Systems (as specified)
- 10 Electrical Systems (as specified)
- 11 Plumbing Systems (as specified)

C. Refer to Instructions to Bidders for substitutions.

1.2 PUNCH LIST

A. Refer to Section: 00 73 00 Supplemental Conditions.

1.3 SUBSTANTIAL COMPLETION

A. Refer to Section: 00 73 00 Supplemental Conditions.

1.4 CONTRACT CLOSE-OUT

A. Refer to Section: 00 73 00 Supplemental Conditions.

1.5 RECORD DRAWINGS:

A. Upon Substantial Completion, the Contractor shall be furnished, at no charge, a complete set of electronic files in PDF Format.

B. Upon request, the Architect and / or Consultants shall assist the Contractor with understanding the structure and composition of the electronic files to facilitate the generation of the Record Drawings.

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- C. The Contractor shall modify the title block on each / every sheet to include only the project name, project address, school district, consultants name and address, date and clearly identify the set as "Record Drawings".
- D. All Record Drawing work shall be performed in a professional manner, neat and legible and shall maintain the format / structure / composition of the original Contract Document drawings.
- E. All modifications, additions, deletions and revisions made to the project during the construction phase shall be reflected on the Record Drawings; and shall include, but not necessarily limited to:
 - 01 All as-built dimensions (different than original dimensions)
 - 02 All as-built conditions relative to underground plumbing, sanitary and storm piping installations, natural gas piping and electrical conduits; shown accurately to within twelve inches (12").
 - 03 All as-built conditions relative to ductwork installations; shown accurately to within six inches (6").
 - 04 All as-built conditions relative to HVAC water piping installations; shown accurately to within six inches (6").
 - 05 All as-built conditions relative to underground electrical conduit installations; shown accurately to within six inches (6").
 - 06 All approved CPR's resulting in a physical change in the Work.
 - 07 All RFI's resulting in a physical change in the Work.
 - 08 All AEA's resulting in a physical change in the Work.
 - 09 All Minor Changes resulting in a physical change in the Work.
 - 10 All Construction Change Directives resulting in a physical change in the Work.
- F. All modifications shall be represented by accurately depicting the revised modifications / configurations.
- G. Upon completion of all revisions to the Record Drawings, the drawings shall be copied to a disc maintaining the exact folder / file structure originally furnished to the Contractor.
- H. As a condition of Contract Close-Out, the Contractor shall deliver to the Owner one (1) complete set of black & white Record Drawings, and two (2) portable hard drive containing the electronic version of the Record Drawings.

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SECTION 02 06 14
GEOTECHNICAL REPORT

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 for substitutions.

1.2 APPLICABILITY

- A. Report is provided for proposer's general information only. Architect and Owner shall not be held responsible for accuracy of data contained in the geotechnical report.
- B. Proposers shall visit and acquaint themselves with existing conditions and make any additional investigations they deem necessary to properly propose work and satisfy themselves as to existing subsurface conditions. Such investigations shall be performed only under time schedules and arrangements approved in advance by the Architect/Owner.
- C. No additional amount will be made available to the successful proposer for work arising from failure to examine site or subsoil conditions.
- D. The geotechnical report is not a part of the Contract Documents.
- E. Copies may be attained by submitting a request to the Architect.

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SECTION 02 41 19

SELECTIVE DEMOLITION

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 for substitutions.

1.2 SCOPE

- A. Complete all demolition work as shown on the drawings, and as specified herein.

1.3 CONDITIONS AT SITE

- A. Visit the site and examine the existing conditions. Note all conditions as to character and extent of work involved.

1.4 PERMITS, ORDINANCES, ETC.

- A. Procure and pay for all necessary permits or certificates required to complete the work specified. Make any and all required notifications and comply with all applicable Federal, State and local ordinances.

PART 2 - PROTECTIONS

- A. Execute all demolition work in an orderly and careful manner with due consideration for any existing structures, including any part of the surrounding areas which are to remain. Barricade and cover as necessary to protect pedestrians, workmen and adjacent properties. Protect any existing active service lines, indicated or not. Provide adequate protective covering to assure that no damage occurs to existing areas.
- B. Avoid any encroachment on adjacent properties. Repair and make good any damage to adjoining properties or improvements caused by operations, including any damage or loss to adjoining materials.
- C. Stop work immediately and notify Owner and Architect if any hazardous material is encountered (especially asbestos or lead based products).

PART 3 - EXECUTION

- A. Keep all pedestrian areas clear for passage at all times.
- B. Conduct operations so as not to interfere with adjacent roads, streets, drives, walks, service lines and the like.
- C. Backfill any trenches caused by demolition work.

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- D. Salvage of Removed Material: The Owner reserves the right to claim all material/equipment removed under this contract. The General Contractor must contact Architect regarding the salvaging of removed materials/equipment other than concrete or pavement realated materials.
- E. Disposition of Removed Material: All material removed under this Contract, which is not to be salvaged or reused, shall become the property of the Contractor and be promptly removed from the site. Do not store or permit debris to accumulate on the site.
- F. The Contractor shall review the contract documents as they relate to selective demolition. Items that will interfere with new work shall be removed as required to coordinate with the new work.
- G. Clean-Up: On completion of demolition work, leave property and adjacent areas clean and satisfactory to local authorities and the Architect.

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SECTION 04 20 00

UNIT MASONRY

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 for substitutions.
- B. Refer to Section 00 11 53 for Pre-Qualified Sub-Contractors.

1.2 SCOPE

- A. Refer to Section 01 23 00 – Alternates
- B. Provide all masonry work as indicated on the Drawings, including CMU and stone veneer.
- C. Provide all masonry reinforcing and ties as specified here-in.
- D. Provide water repellant application to exterior veneer masonry.

1.3 REFERENCES

- A. American Society for Testing and Materials
ASTM A153, Zinc Coating (Hot Dip) on Iron & Steel Hardware
ASTM C67, Sampling & Testing Brick & Structural Clay Tile
ASTM C90, Hollow Load-Bearing Concrete Masonry Units
ASTM C652, Hollow Brick (Hollow Masonry Units Made from Clay or Shale)
ASTM C744
ASTM C140
CRSI, "Manual of Standard Practices"

1.4 SUBMITTALS

- A. Product Data: Submit schedules, charts, literature, and illustrations to indicate the performance, fabrication procedures, product variations, and accessories for all products proposed to be furnished..
- B. Samples
 - 01 Each type of finished stone to be provided in quantities sufficient to show range of color where applicable.
 - 02 Samples of brick ties proposed to be furnished.
 - 03 Samples of full range of actual mortar color selections. Paper or digital samples are not acceptable.
 - 04 Sample of mortar deflector proposed to be furnished.
- C. Sample panel: Sample panel shall be 4' long x 4' high panel showing selected color range and texture, bonding, mortar color, joint shape, and quality workmanship. Include an expansion joint. Sample panel shall remain at the jobsite until all masonry is completed.
 - 01 Panel shall be "L" shaped (4' x 4') with metal stud / drywall back-up wall on one side and CMU back-up on one side. Coordinate as required with other trades.

02 Once accepted by the Architect, the sample panel shall be the standard by which installed is judged.

1.5 INSTALLATION CONFERENCE: Refer to Section 01 32 29 - Notification of Architect Requirements

1.6 TESTS AND INSPECTIONS

A. Architect may require tests and inspections as necessary to verify quality and strength of brick materials, mortar, grout, and workmanship. Laboratory tests of materials, mortar, and grout will be made per ASTM standard procedures.

B. Owner will select Testing Laboratory and Owner will pay for all work required by Testing Laboratory.

1.7 DELIVERY, STORAGE AND PROTECTION

A. Deliver and store materials in dry protected areas off ground. Keep free of stain or other damage before, during and after installation. Replace any damaged material at no cost to Owner.

1.8 SITE CONDITIONS

A. Cold Weather Protection:

01 No masonry shall be laid when the temperature of the outside air is below 40° F, unless protection measures are employed and pre-approved by the Architect.

B. Protection measures for cold weather erection include maintaining space and masonry unit temperatures of at least 40° F for 48 hours, prior to and after erection.

1.09 WARRANTY

A. Warrant the work specified herein for one year against becoming unserviceable or causing an objectionable appearance, resulting from either defective or nonconforming materials and workmanship.

B. Defects shall include, but not be limited to the following:

01 Noticeable deterioration of unit or mortar finish.

02 Chalking or dusting excessively.

03 Changing sheen in irregular fashion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Stone Veneer (random ashlar)

01 Smokey Mountain Ashlar, Sawn top and Bottom with Chopped ends (Basis of Design) available at Upchurch Kimbrough

02 or equal color and cut

- 1 B. Masonry Reinforcing, Anchors and Ties
- 2 01 Heckmann Building Products (basis of design)
- 3 02 Dayton Superior / Dur-O-Wal
- 4 03 Wire-Bond
- 5 04 Hohmann & Barnard (HB)

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9 **2.2 MATERIALS**

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- A. Masonry Veneer - Stone Veneer:
 - 01 Sizes: Size will vary from the face Stone X 3" thick.
 - 02 Colors:
 - a. Color to be Smokey Mountain Ashlar
 - 03 Provide solids and shapes as required (all colors)
 - a. Random Ashlar (Field Stone)
 - b. Thin Stone at interior locations
 - 01. cut field stone to be roughly 1 ½" thick to be applied to expanded metal lath.
 - 04 Mortar Net: Provide 1" mortar net at base of masonry wall
 - 05 Expanded Metal Lath and Felt Paper:
 - a. Provide thin stone mounted to expanded metal lath with 30lb felt backing at interior locations.

- B. Concrete Masonry Units:
 - 01 Face Dimensions: 8" x 16", modular depths or size as indicated on drawings
 - 02 Color shall be standard gray
 - 03 Comply with ASTM C90 (class D-2 block at rated walls)
 - a. Grade: N, highest standard
 - b. Type: I, Moisture -controlled unit
 - c. Aggregate: Lightweight
 - 04 Curing: Rotary kiln process
 - 05 Provide bullnose units at all outside corners; except at walls to receive ceramic tile finish. Coordinate as required.
 - 06 Complete with bond beam, control joints, jambs, lintels soaps and fillers to match and compliment block units.

- C. Mortar:
 - 01 Materials for Mortar:
 - a. Hydrated Lime: ASTM C-207, TYPE "S"
 - b. Portland Cement: ASTM C-150, Type 1
 - c. Water: Clean and potable
 - d. Sand: ASTM C-144
 - 02 Mix Design: (Proportions by volume)
 - a. Type: ASTM C-270, Type "S"
 - b. Proportions: 1 part cement, 1/2 part hydrated lime and 4-1/2 parts sand to provide a compressive strength of 1800 PSI in 28 days.
 - c. Mixing: Thoroughly machine-mix for at least 5 minutes after all material is in mixer.
 - d. Do not use calcium chloride
 - b. Compressive Strength: 1800 psi at 28 days
 - 03 Materials for Mortar:
 - a. Hydrated Lime: ASTM C-207, TYPE "N"
 - b. Portland Cement: ASTM C-150, Type 1

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- c. Water: Clean and potable
- d. Sand: ASTM C-144
- 04 Mix Design: (Proportions by volume)
 - e. Type: ASTM C-270, Type "N"
 - f. Proportions: 1 part cement, 1 part hydrated lime and 6 parts sand to provide a compressive strength of minimum 750 PSI in 28 days.
 - g. Mixing: Thoroughly machine-mix for at least 5 minutes after all material is in mixer.
 - h. Do not use calcium chloride
 - i. **Premixed, integral color, mortar acceptable as an alternative**
- 05 Mortar Colors:
 - a. Concrete Masonry Units: Use standard cement color.
 - b. Stone: Colored, As selected by the Architect from manufacturer's full range of colors – minimum of 12. Submit sample to Architect for approval.

D. Reinforcement/Tie Systems:

- 01 General: Reinforcement used in all wythes shall be hot-dipped galvanized after fabrication in accordance with ASTM A153.
- 05 At All Veneer Masonry Walls with Metal Stud Partitions Back-up Wall – With Rigid Insulation: wire tie and screw on anchor. Tie shall be a 3/16" diameter wire tie and shall be extend to 3/4 inch from outside face of veneer. Equal to Hohmann & Barnard (HB) 2 seal tie (with dual gaskets) and Byna-Loc wire ties, Hot Dipped Galvanized.
- 06 At CMU Back-Up Walls: Two piece double eye rod wire anchor. Size: 3/16" diameter x 2-1/2" x 4-3/4". With double pintle wire tie. Size: 3/16" diameter x length required to extend to 3/4" from face of masonry veneer. Equal to "Heckman" No. 262 Double Eye Rod Anchor with No. 263 Double Pintle Tie.
- 07 Control Joint Anchor: Equal to Heckman No. 351 anchor at brick veneer, and No. 350 at block walls.
- 08 Cast Stone: Equal to Heckman No. 152 and 152A, located as per manufacturer's recommendations.

E. Masonry Cleaning Products: **(verify application rates and products compatibility with final selected masonry prior to application with manufacturer).**

- 01 Cleaning materials for the purpose of removing excess mortar, job dirt and normal job stains from light colored stone and tile units which are not subject to metallic stains shall be Sure Klean® 600 Detergent manufactured by Prosoco., Irving, Texas; or approved equal.
 - a. Specific Gravity: 1.117
 - b. pH: 0.3 (1:6 dilution)
 - c. Flash Point: None
 - d. Freeze Point: -30° F (-34.4° C)
 - e. Wt/Gal.: 9.3 lbs.
- 02 Cleaning materials for purposes of removing excess mortar, job dirt and normal job stains from stone and tile units which are subject to metallic oxidation stains shall be Sure Klean® Vana Trol® manufactured by Prosoco., Irving, Texas; or approved equal.
 - a. Specific Gravity: 1.117
 - b. pH: 0.3 (1:6 dilution)
 - c. Flash Point: None

- 1 d. Freeze Point: -30° F (-34.4° C)
- 2 e. Wt/Gal.: 9.3 lbs.
- 3
- 4 03 Cleaning material for removal of excess mortar and job dirt from stone, concrete,
- 5 tile and stone surfaces shall be Enviro Klean® Mortar & Grout Remover
- 6 manufactured by Prosoco., Irving, Texas; or approved equal.
- 7 a. Flash Point: None
- 8 b. Specific Gravity: 1.00
- 9 c. PH: 1.6 (dilute 1 pound of powder to 1 gallon of water)
- 10
- 11 04 **Consult stone supplier/manufacturer to confirm proper selection of cleaning**
- 12 **detergent to minimize reaction from metallic or other mineral deposits prior to**
- 13 **use.**
- 14
- 15 F. Masonry Water Repellant Sealant:
- 16 01 Water Repellant Sealant materials shall be Sure Klean® Natural Stone Treatment
- 17 WB Plus manufactured by Prosoco, Irving, Texas; or approved equal.
- 18 a. Solids: 15%
- 19 b. Specific gravity: 1.04
- 20 c. Flash point: > 212 degrees f (>100degrees c)
- 21 d. Voc: <100 grams/liter (astm d 3960)
- 22 e. Freeze point: 32 degrees f (0 degrees c)

23 **PART 3 - EXECUTION**

24

25 **3.1 PREPARATION OF MATERIALS**

- 27 A. Concrete Masonry Units
- 28 01 Where cutting is required, masonry shall be cut with a sharp masonry saw.
- 29
- 30 B. Stonework: Dampen stone before laying in a manner consistent with the nature of the
- 31 stone, the mortar, and the weather conditions.
- 32
- 33 C. Mortar and Grout:
- 34 01 Use suitable containers for material measurement. Measuring sand by the shovel
- 35 is not acceptable.
- 36 02 Mix a minimum of 5 minutes
- 37 03 Consistency will completely fill all spaces intended to receive grout
- 38 04 Use within 2-1/2 hours of initial mixing.
- 39 05 Mortar or grout shall not be used if curing has progressed to yield a stiff
- 40 consistency.
- 41
- 42 D. Reinforcement:
- 43 01 Reinforcement shall be free from loose rust and other coatings that would reduce
- 44 the bond.
- 45 02 Cut accurately to length and bend by such methods as will prevent injury to the
- 46 material.
- 47 03 Straighten out kinks or bends.
- 48

49 **3.2 ALLOWABLE TOLERANCES**

- 51 A. Maximum Variation from Plumb:
- 52 01 In lines and surfaces of columns, walls and at rises:

- 1 a. 1/4" in 10' (1:480)
- 2 b. 3/8" in 20' (maximum)
- 3 c. 1/2" in 40' (1:960)
- 4 02 For external corners, expansion joints and other conspicuous lines:
- 5 a. 1/4" in 20' (maximum)
- 6 b. 1/2" in 40' (1:960)

- 7
- 8 B. Maximum variation from level:
- 9 01 1/4" in any bay or 20'
- 10 02 1/2" in 40' (1:960)
- 11

12 **3.3 INSTALLATION**

13

14 A. Contractor shall use all means necessary to assure all masonry work is adequately braced

15 at all times during erection.

16

- 17 B. General:
- 18 01 Do not use irregularly damaged stone or chipped block where exposed to view.
- 19 02 Use masonry saws to cut and fit exposed units.
- 20 03 Lay units plumb, true to line, and with level courses accurately spaced within
- 21 allowable tolerances.
- 22 04 Do not furrow bed joints.
- 23 05 Stop off horizontal run by racking back in each course; toothing is not permitted.
- 24 06 Adjust units to final position while mortar is soft and plastic.
- 25 07 If units are displaced after mortar has stiffened, remove, clean joints and units and
- 26 re-lay with fresh mortar.
- 27 08 When joining fresh masonry to set or partially set masonry:
- 28 a. Remove loose masonry units and mortar
- 29 b. Clean and lightly wet exposed surface of set masonry prior to laying fresh
- 30 mortar.

31

32 C. Metal Door Frames Anchored to Masonry: Fill jamb frames solid with mortar as work

33 progresses. Install masonry anchors, securing to frame and adjacent vertical

34 reinforcement. Fill head frame solid with mortar prior to installing lintel units.

35

36 D. Lintels and Bond Beams: Provide reinforced unit type, except where steel lintels are

37 shown. Use reinforcing bars as shown on the drawings. With concrete, completely fill in

38 lintel block and bond beams. Provide 8 inch bearing at end of lintels.

39

40 E. Partitions Tops: Allow space at top of horizontal spanning walls for compressible joint

41 back-up and sealant as specified in Sealant section. Anchor top of walls to deck or

42 structure.

43

- 44 F. Brick Ledge and Through Wall Flashing:
- 45 01 Clean surface of masonry smooth and free from projections which might puncture
- 46 or otherwise damage flashing material.
- 47 02 Place through-wall flashing on bed of mortar and cover with mortar.
- 48

- 49 G. Mortar Beds:
- 50 01 Place mortar in a manner which will result in the development of adequate bond
- 51 between the masonry and the reinforcement.
- 52 02 Lay units with full mortar coverage on horizontal and vertical / head joints in all
- 53 courses.

- 1 03 Provide sufficient mortar on ends of masonry unit to fill head joints.
- 2 04 Rock closures into place with head joints thrown against two adjacent masonry
- 3 units in place.
- 4 05 Do not pound corners or jambs to fit stretcher units after setting in place.
- 5 06 Where adjustment to corners or jambs must be made after mortar has started to
- 6 set, remove mortar and replace with fresh mortar.
- 7
- 8 H. Weepholes:
- 9 01 Provide weepholes in head joints in first course immediately above all flashing at
- 10 all exterior stone walls.
- 11 02 Leave head joint free and clean of mortar. Provide a temporary strip of rope at
- 12 each weep to be removed upon completion of panel.
- 13 03 Spacing: 30 inch o.c. maximum
- 14 04 Keep weepholes and area above flashing free of mortar droppings.
- 15
- 16 I. Cavity:
- 17 01 The level to which masonry cavities shall be free of excess mortar shall be as
- 18 established and approved on the masonry mock-up wall. Keep masonry cavity
- 19 clean and free of excess mortar.
- 20 02 Carefully lay first course at brick ledge and lintels, making sure that cavity is clean
- 21 of all excess mortar which may impede the flow of moisture through weep holes.
- 22 03 As work progresses, trowel and remove all protruding fins in cavity flat on inner
- 23 surface of the wythe brick cavity.
- 24 04 Take all necessary precaution to not allow excess mortar to drop within cavity
- 25 from the inner surface of the wythe.
- 26 a. Use wood strips with attached wire pulls or other suitable means to
- 27 collect all loose mortar below the course being laid.
- 28 b. Remove all mortar and clean the device at regular intervals while mortar
- 29 is still elastic and able to be removed without disturbing masonry already
- 30 laid above it.
- 31 05 Cavities shall be inspected and excess mortar within the masonry cavity shall be
- 32 grounds for removal and replacement of masonry if no other practical means is
- 33 available to remove excess mortar; all at contractor's expense.
- 34
- 35 J. Mortar Joints and Patterns:
- 36 01 Lay stone in random ashlar pattern. Refer to drawings for accent coursing, where
- 37 applicable.
- 38 02 Lay standard CMU in one-half bond pattern.
- 39 03 Provide flush joints where concealed from view and where dampproofing is
- 40 scheduled.
- 41 04 Provide standard concave tooled joint where masonry is exposed to view for brick
- 42 and CMU, typically. Provide recessed accent joints in brick where indicated on
- 43 elevations.
- 44 05 All mortar joints to be of consistent size.
- 45 06 Refer to the drawings for paver patterns.
- 46
- 47 K. Reinforcement/Tie Systems:
- 48 01 General:
- 49 a. Completely embedded in mortar or grout
- 50 b. All reinforcement consisting of bars or wire 1/4 inch or less in diameter,
- 51 embedded in the horizontal mortar joints, shall have no less than 5/8 inch
- 52 mortar coverage from the exposed face.

- 1 c. Truss reinforcing within each wythe shall be at 16 inch o.c. vertically for
- 2 exterior wythes and back-up wythes, whether detailed or not.
- 3 d. Veneer anchors at sheathing covered metal stud exterior walls shall be
- 4 attached on outside face of sheathing using cadmium plated sheet metal
- 5 screws. Spacing shall be 16 inch o.c. horizontally and 16 inch o.c. vertically.
- 6 e. Veneer anchors at Interior brick walls with metal stud back up shall be the
- 7 same as paragraph "D" above, except anchors shall be attached directly
- 8 to metal stud with cadmium plated sheet metal screws.
- 9 f. At intersection of all perpendicular masonry walls provide two vertical
- 10 rows of corrugated wall ties at 16 inch o.c. vertically (7/8" wide x 16 gauge
- 11 galvanized steel).
- 12 g. In cavity walls with CMU back up, embed truss type horizontal
- 13 reinforcement with integral wall ties every 16 inches o.c. vertically.
- 14 h. Splices in reinforcement: Splices may be made only at such points and in
- 15 such manner that the structural strength of the member will not be
- 16 reduced. Lapped splices shall be 8 inches. Welded or mechanical
- 17 connection shall develop the strength of the reinforcement.
- 18 i. Corrugated strap ties shall not be used as veneer anchors.
- 19 j. Place joint reinforcement in the first two bed joints above and the first
- 20 two bed joints below masonry openings.
- 21 k. Provide masonry ties at floor and roof decks as indicated.

22
23 L. Corners: Connect corners with No. 9 galvanized wire or corrugated tie using one tie for
24 each 4 inches of nominal wall thickness.

- 25
26 M. Expansion Joints/Control Joints:
- 27 01 The mortar joint which stops at the expansion joint cavity shall be struck flush with
 - 28 the masonry unit, producing a continuous flat surface for the sealant to adhere to.
 - 29 02 Place masonry control joints as indicated on the drawings. If not indicated, place
 - 30 joints at 20'-0" O.C. maximum. Coordinate with Architect for exact locations.
 - 31 03 Provide CMU control joints directly over concrete slab control joints. Whenever
 - 32 possible, lay out CMU so that control joint will coincide with CMU module (20'
 - 33 maximum spacing between control joints).
 - 34 04 Provide control joints at structural columns to isolate movement from continuing
 - 35 or intersecting walls and columns.

- 36
37 N. Sealant Joints:
- 38 01 Allow for sealant joints around outside perimeters of exterior doors, window
 - 39 frames and other wall openings.
 - 40 02 Uniform depth: 3/4 inch
 - 41 03 Uniform width: not less than 1/4 inch and not more than 1/2 inch.
 - 42 04 Provide sample for Architects approval.
 - 43 05 Refers to drawing for locations and details of accent joints.

44
45 **3.4 CLEANING**

46
47 A. At completion of the work, fill and retool holes in joints of exposed masonry surfaces with

48 mortar. After pointing has set and hardened, clean exposed masonry surfaces with

49 cleaning agent recommended for each type of masonry used. Leave masonry clean, free

50 of mortar daubs and with tight mortar joint throughout. After stone work is set, protect

51 all edges and corners from damage. The cleaning shall be in accordance with

52 manufacturers printed instructions for type of cleaning agent used.

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3.4 MASONRY WATER REPELLANT SEALER

- A. Upon completion of cleaning all masonry surfaces, apply the masonry water repellent sealant material to all masonry surfaces using a low pressure

- B. Application: Before applying, read “Protect” and “Precautionary Measures” sections in the Manufacturer’s Product Data Sheet for Weather Seal Siloxane PD. Refer to the Product Data Sheet for additional information about application of Weather Seal Siloxane PD. Do not dilute or alter.

- C. Vertical Application Instructions
 - 01 For best results, apply protective treatment “wet-on-wet” to a visibly dry and absorbent surface.
 - 02 Alternate Application Methods
 - a. Spray: Saturate from the bottom up, creating a 4” to 8” (15 to 20 cm) rundown below the spray contact point. Let the first application penetrate for 5-10 minutes. Re-saturate. Less will be needed for the second application.
 - b. Brush or roller: Saturate uniformly. Let protective treatment penetrate for 5 to 10 minutes. Brush out heavy runs and drips that don’t penetrate.
 - c. Dense Surface Application Instructions
Apply in a single, saturating application with no run down. Back roll all runs and drips to ensure uniform appearance. DO NOT OVER APPLY. One application is normally enough. Always test.
 - 03 Horizontal Application Instructions
 - a. Saturate in a single application. Use enough to keep the surface wet for 2 to 3 minutes before penetration.
 - b. Brush out puddles until they soak in. Treated surfaces dry to touch in 1 hour. C. Protect surfaces from rainfall for 6 hours following treatment. Many surfaces need several days to develop full water repellency.

3.5 PROTECTION

- A. Cover over all unfinished work at night against the elements with plastic sheet or other material approve by Architect to prevent water from entering cavities.

END OF SECTION

1 **SECTION 04 72 00**

2 **CAST STONE WORK**

3
4
5
6 CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

7
8 **PART 1 - GENERAL**

9
10 **1.1 DESCRIPTION**

- 11
12 A. Refer to Section 00 21 16 for substitutions.
- 13
14 B. Work Included: Include the following work in addition to items normally part of
15 this Section.
16 01 Cast Stone at window sills and where indicated on drawings.
- 17
18 C. Responsibility of Coordination: Coordinate the work specified herein with the
19 following work:
20 01 Mortar and accessories
21 02 Stone Veneer

22
23 **1.2 WARRANTY**

- 24
25 A. Warrant the Work specified herein for one year against becoming unserviceable or
26 causing an objectionable appearance resulting from either defective of
27 nonconforming materials and workmanship. (Under provisions of Section 01710).
28
- 29 B. Defects shall include, but not be limited to, the following:
30 01 Changing sheen in irregular fashion
31 02 Cracking, spalling
32 03 Releasing from substrate
33 04 Stains

34
35 **1.3 SUBMITTALS**

- 36
37 A. Samples: Submit two (2) 12" x 12" units of each color, pattern, texture and finish as
38 selected by Architect.
- 39
40 B. Shop Drawings: Indicate size, material and finish. Show locations and installation
41 procedures. Include details of joints, attachments and clearances.
42

43 **1.4 DELIVERY AND STORAGE**

- 44
45 A. Stack stones on non-staining wood skids clear of the ground. Protect with non-
46 staining plastic membrane or waterproof paper.

47
48 **1.5 PROTECT CONDITIONS**

- 49
50 A. Refer to Section 04200 - Unit Masonry
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PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Stone Castle
- B. Terra Cotta and Cast Stone Mfg., Inc.
- C. Pineapple Grove Designs
- D. Or Equal

2.2 MATERIALS

- A. Cast Stone by Terra Cotta and Cast Stone Mfg., Inc. or approved equal.
 - 01 Cast Stone color will selected by the Architect.
- B. Job-mixed mortar components
 - 01 Portland Cement, ASTM C-150, Type I
 - 02 Masonry Sand
 - 03 Lime, ASTM C-207
 - 04 Iron oxide colors
- C. Masonry Sealer: Breather type (non-filming forming) sealer. Advance Chemical Technology's Sil-Act 22 or General Electric Silicon PWR 255, or equal.
- D. Dowels and reinforcing as recommended by manufacturer.

2.3 MANUFACTURED UNITS - CULTURED STONE

- A. Compressive Strength: 6000 psi minimum
- B. Absorption: 5% maximum
- C. Provide sizes and shapes as indicated on the drawings.
- D. Provide size and shapes as indicated on plans.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Masonry Surfaces Clean and Untreated: Examine newly laid masonry closely to ensure that its finished surface contains no releasing agents (form oil). If it does contain form oil, etch surface with muriatic acid, rinse thoroughly and/or score with a wire brush.
- B. Masonry Surfaces: Remove paint, coatings, sealers and dirt by sandblasting; rinse with clear water.

3.2 MORTAR MIXING

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- A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C-482, type N.
- B. Do not use anti-freeze compounds to lower the freezing point of mortar.

3.3 APPLICATION

- A. Apply 1/2 inch to 3/4 inch of mortar to dampened masonry, covering a maximum of 10 square feet at one time. Press the units firmly into position in soft mortar bed, joggle each piece slightly to bond firmly, causing mortar to extrude slightly around edges of units.
- B. Place units with uniform mortar joints. Stone joints should not be over 1/2 inch width with horizontal joints level.
- C. Plan work to minimize job site cutting. Perform necessary cutting with proper tools to provide uniform edges; take care to prevent breaking unit corners or edges.
- D. Minimum Width of Units at Inside Corners and at Perimeters of Openings: 3 inches; maintain full thickness of stone units.
- E. Remove excess mortar; do not allow mortar to set up on face of units. Point and tool joints before mortar has set. Clean and finish joints in accordance with manufacturer's instructions.
- F. Apply breather type (non film forming) masonry sealer to completed surfaces in accordance with manufacturer's instructions. Sealer required on all surfaces.

END OF SECTION

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SECTION 05 12 00

LIGHT GAUGE STEEL FRAMING

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 substitutions.
- B. Scope: Framing at all exterior walls and associated assemblies.

1.2 RELATED WORK

- A. Rough Carpentry – Section 06 10 00
- B. Gypsum Wallboard Systems – Section 09 28 16

1.3 QUALITY ASSURANCE AND REFERENCES

- A. All materials proposed to be furnished shall comply with the following:
 - 01 AISI: Specification for the Design of Cold-Formed Steel Structural Members. Latest edition and amendments.
 - 02 ASTM C955: Standard specification for load bearing (transverse and axial) steel studs, runners (tracks), bracing and bridging for screw application of gypsum board metal plaster bases.
 - 03 ASTM A653: Steel Sheet, Zinc Coated (galvanized) by the Hot-Dip Process, Structural Quality
 - 04 ASTM A924: Steel Sheet, Metallic Coated by the Hot-Dip Process, General Requirements.
 - 05 ASTM A570: Hot-Rolled Carbon Steel Sheets and Strip, Structural Quality
 - 06 ASTM A611: Steel, Cold-Rolled Sheet, Carbon, Structural
 - 07 MLSFA: Steel Framing Manual
 - 08 Welding Qualifications: Quality welding processes and welding operations in accordance with AWS "Standard Qualification Procedure".
- B. All exterior framing shall be designed to meet or exceed a wind load of 110 MPH.
- C. Exterior studs CS will be a minimum 6” deep and 16 GA. studs will be L/360 minimum.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's specifications and other data needed to prove compliance with specified requirements for all products proposed to be furnished.
- B. Shop Drawings: Required for all multi-component assemblies and all welded exterior wall and similar light gage steel framing assemblies.

- 1 C. Provide engineering calculations for all framing at exterior walls. Include framing
- 2 and connection details for all wall conditions (i.e. solid, door openings, window
- 3 openings, special conditions); complete with fastener size, quantity and installation
- 4 patterns. All calculations shall be sealed and signed by a Texas Registered Engineer.
- 5
- 6 D. Manufacturer's installation instructions for all components.
- 7
- 8 E. Sample Panel: Sample panel shall be 8' long x 6' high panel showing completed
- 9 exterior light gage steel framing assembly, complete with exterior sheathing,
- 10 dampproofing and rigid insulation (where applicable). Coordinate as required with
- 11 other trades. Refer to section 04200 – Masonry for additional information.
- 12

13 **PART 2 - PRODUCTS**

14

15 **2.1 MANUFACTURERS**

- 17 A. The following manufacturers are acceptable to provide materials:
- 18 01 Dietrich
- 19 02 Clark Western
- 20 03 Marino/Ware
- 21 04 Southeastern Stud & Components, Inc
- 22 05 Or Equal
- 23

24 **2.2 MATERIALS**

- 26 A. Steel Stud System:
- 27 01 Stud Type: C-shaped galvanized steel stud sections,
- 28 minimum 16 gauge / 54 mil, ASTM A446, Grade A, 33,000 psi minimum yield
- 29 (FY).
- 30 02 Punched web with minimum 1 5/8 inch flanges with 1/2 inch
- 31 flange return lip.
- 32 03 Track, Deep leg slotted track, Bridging, Bracing and Miscellaneous Items:
- 33 ASTM C955 Formed galvanized steel, same gage as studs.
- 34

35 B. Maximum Unbraced Heights (MUH): All light gage steel framing at exterior

36 walls shall be minimum 6" (except at furred framing) and shall comply with the

37 following sizes, gage and spacing, based on wind load of 25 PSF:

38

<u>Stud</u>	<u>Stud</u>	<u>Min</u>	<u>MUH at</u>	<u>MUH at</u>
<u>Size</u>	<u>Gage</u>	<u>Sx</u>	<u>16" O.C.</u>	<u>12" O.C.</u>

2-1/2"	16	0.306	7.90'	8.70'
	14	0.372	8.50'	9.30'

44 Note: only allowed at structural infill and other locations specifically shown on the

45 Drawings.

3-5/8"	16	0.499	10.60'	11.60'
	14	0.610	11.30'	12.40'

49 Note: only allowed at structural infill and other locations specifically shown on the

50 Drawings.

6"	16	0.991	15.70'	17.30'
	14	1.220	16.80'	18.50'

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8"	16	1.494	19.80'	21.80'
	14	1.842	21.30'	23.40'
10"	16	2.076	23.80'	26.20'
	14	2.564	25.50'	28.10'

- C. Minimum Material Thicknesses / Mills for Uncoated Steel:
- | | | | |
|----|-----------|----------------------|--------|
| 01 | 16 gauge: | 0.0635" (+/- 0.003") | 54 Mil |
| 02 | 14 gauge: | 0.0785" (+/- 0.003") | 68 Mil |
| 03 | 12 gauge: | 0.1084" (+/- 0.003") | 97 Mil |

- C. Fastenings:
- 01 Self-Drilling Self-Tapping Screws, Bolts, Nuts and Washers: Hot-dip galvanized ASTM A653
 - 02 Anchorage Devices: Power-driven or powder-actuated, drilled expansion bolts; or screws with sleeves.
 - 03 Welding: AWS D1.3
- D. Miscellaneous Materials:
- 01 Provide angle clips, bracing, etc. as required to connect light gage steel framing to structural steel framing; same gage as studs.
- E. Finish:
- 01 Provide minimum G60 galvanized coating per ASTM A525.
 - 02 Touch-up all field welds with inorganic zinc-rich primer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install metal framing systems in accordance with stud manufacturer's printed instructions; and engineered calculations and details.
- B. Fastening of components shall be by means of approved self-drilling screws or welding. Screw and welds shall be of sufficient size to ensure strength of connection. All welding shall comply with American Welding Society "Specification for Welding Sheet Steel in Structure."
- C. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer, except do not exceed 24 inches o.c. for nail or power-driven fasteners, and shall not exceed 16 inches o.c. for other types of attachment. Provide fasteners at corners and ends of tracks. Deep leg, slotted track at top track required.
- D. Unless otherwise shown, space studs a maximum of 16 inches O.C.
- E. Install continuous, horizontal bridging at mid-height in walls up to 10 feet high, and at 5'-0" O.C. maximum in walls over 10 feet high.
 - 01 All bridging shall be welded.

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F. Coordinate with other trades as required for proper installation of interfacing work.

3.2 TOLERANCES

- A. Install exterior wall framing within 1/4 inch plumb over the full height of the wall.
- B. Maintain a straight, true wall within 1/4 inch per 40 linear feet length, non-cumulative.
- C. Coordinate exact heights required to accept wood blocking, etc. required for the proper installation and interface with work of other trades.

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SECTION 05 55 00

MISCELLANEOUS METALS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 for substitutions.

1.2 REFERENCES

- A. American Institute of Steel Construction
- B. American Welding Society
- C. American Society of Testing Materials
- D. American Iron and Steel Institute

1.3 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Shop Drawings:
 - 01 Complete shop drawings for the Architect's approval. Show all layouts, sizes, methods of construction and installation, including sizes and types of all fastening devices.
- C. Samples as noted.

1.4 SCOPE

- A. Metal Handrails, Refer to Alternates - Section 01 23 00.
- B.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural Steel: Comply with ASTM A36
- B. Welding: Comply with American Welding Society Code.
- C. Bolts:
 - 01 Comply with ASTM A307
 - 02 Size: 3/4 inch, unless otherwise noted.
- D. Anchors:
 - 01 Expansion Bolts:
 - a. Rawl Calk-Ins or Arrow Series 4000, 1/4 inch or less.
 - b. Rawl Multi-Calks - greater than 1/4 inch. Top shall be 1/2 inch below concrete surface.
 - 02 Molly Screw Anchors:
 - a. In walls 1/16 - 5/8 inch thick, use "S" length
 - b. In walls 5/8 - 1 1/4-inch thick, use "L" length
 - c. In walls 1 1/4 - 1 3/4 inches thick, use "XL" length.

- 1 E. Shop Priming:
- 2 01 Shop coat any ungalvanized ferrous metal with primer.
- 3 02 Clean iron and metal to be primed of scale, dirt and dust by steel scrapers, wire
- 4 brushers or sandblasting. Remove oil and grease with petroleum naphtha.
- 5 03 Thoroughly work paint into all joints by brush. Overall application of brush or
- 6 spray coat of red lead primer per Fed. Spec. TT-P-86.
- 7 04 Give any painted built-in portions one-field coat of primer on all abraded parts
- 8 after installation.
- 9
- 10 F. Galvanized Metal:
- 11 01 Comply with ASTM A123.
- 12 02 General: Galvanized all steel sections which are fully or partially exposed to
- 13 weather, regardless if they are scheduled to receive a finish coat of paint or not.
- 14 03 Galvanized items to be painted shall be primed as outlined in Painting and
- 15 Staining Section.
- 16 04 Hot-dip galvanized after fabrication.
- 17 05 Silicone protective coating shall not be used at galvanized items scheduled to
- 18 receive paint.
- 19
- 20 G. Aluminum:
- 21 01 Extruded sections from alloy 6063-T52, meeting the requirements of ASTM B 221
- 22 02 Clear anodized finish samples to be submitted for approval on each item. Submit
- 23 sample of finish weld.
- 24 03 Custom fabricate as shown on the drawings. Grind all welds smooth and flush to
- 25 match adjoining exposed surfaces. Provide cast wall brackets - Julius Blum #376
- 26 04 All fasteners shall be stainless steel with tamper proof bolts and no pop rivets.
- 27 Provide flush counter sunk heads.
- 28 05 All pipe rails shall be schedule 40 and have welded connections with male/female
- 29 splice connections, and have a completely smooth flush finish. All corners and
- 30 angles shall be custom prefabricated. All splices shall occur at supports.
- 31 06 Handrail & Guardrail Manufacturers:
- 32 a. Alumfab, Inc.
- 33 b. Architectural Art Manufacturing, Inc.
- 34 c. Julius Blum & Co., Inc.
- 35 d. Blumcraft of Pittsburgh
- 36 e. J.D. Braun Co.
- 37 f. Crane Veyor Corp.
- 38 g. Daniel Industrial Metals Inc.
- 39 h. Poma Corp.
- 40 i. Rippel Architectural Metals, Inc.
- 41 j. Superior Aluminum Products
- 42 k. R & B Wagner, Inc.
- 43 07 Exterior rails shall be all welded construction
- 44 08 Provide clear epoxy coating where aluminum is in direct contact with concrete
- 45 (only)

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47 **2.2 MISCELLANEOUS METAL ITEMS**

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- 49 A. The following is a list of the principal miscellaneous metal items to be furnished under this
- 50 section. This list is offered only as a guide and Contractor shall thoroughly check
- 51 Drawings for other miscellaneous metals.
- 52 01 All items exposed to the exterior shall be hot-dip galvanized after fabrication.
- 53
- 54 B. Pipe Bollard / Guard Post: Provide and install schedule 40 steel pipe bollard / guard post,
- 55 in fixed and / or removable configuration as detailed on the drawings. Fill with concrete
- 56 after installation. Hot dip galvanized after fabrication.
- 57
- 58 C. Handrails & Brackets:
- 59 01 Exterior Steel Handrails furnish and install 1 1/2 inch diameter schedule 40 steel
- 60 pipe rails & posts and brackets shall be wall type or floor type sleeves as indicated.
- 61
- 62 02 Interior Aluminum Handrails to wood shall have matching plate with 4 screws into
- 63 the flange. In concrete the post shall be in recessed in sleeves. Include all other parts

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- required for finished installation. All work shall be in accordance with codes and access standards. Handrails shall be anodized with a light brushed finish.
- D. Metal Handrails- Painted, 1 ¼” round pipe, shop welded to maximum extent practical, field weld as required, grind smooth all welded connections. Provide wall brackets @48” oc and brackets within 6” terminal ends. Coordinate blocking as required.
 - E. Signs: Provide “handicapped” parking sign with graphics as detailed.
 - F. Loose Lintels - Fabricate from steel shapes as shown; weld joints and grind smooth. Hot dip galvanize after fabrication.
 - G. Masonry Anchors at Steel Columns: Fabricate from 5/16 inch diameter steel, galvanized after fabrication; field weld to columns, space not more than 24 inches o.c. vertically to coincide with horizontal mortar joint elevations. Refer to Structural drawings.
 - H. Expansion Joint Covers: Where Applicable, Anodized extruded aluminum expansion joint covers,
 - 01 Design is based on Conspec Systems (C/S) Group expansion joint covers.
 - 02 Floor-to-floor model GFT-200.
 - 03 Floor-to-wall model GFTW-200.
 - 04 Wall-to-wall model AFW and model AFWC.
 - 05 Other approved manufacturers providing equal products include Pauling Corp., D & B, M&M Systems and Balco.
 - I. Access Doors: 2'-0" x 3'-0" unless otherwise shown on drawings or specified in Divisions 15 and 16. Standard type flush steel doors for wallboard or masonry construction in sizes and locations as shown on the drawings. Provide one at each restroom plumbing chase wall if not indicated on drawing. Provide one 2' x 2' ceiling access panel at each restroom with solid gyp board ceiling. Locations as indicted by the Architect's field representative.
 - 01 Acceptable Manufacturers:
 - a. Bar-Co.
 - b. Cesco Products
 - c. J. L. Industries
 - d. Or Equal
 - J. Frame Supports: Construct frame supports for all aluminum entrances and storefront / curtain walls as detailed and required for a rigid assembly of the aluminum framing.
 - K. Hollow Metal Frame Bracing:
 - 01 Required at all doorframe openings 48” wide and wider; and all window frame openings 72” wide and wider.
 - 02 At each jamb, provide a C3x4.1 continuous channel, anchored at floor and structure above (providing miscellaneous angle framing as required for a rigid assembly).
 - 03 The C3x4.1 shall be welded to the inside jamb stud, prior to installation of the second jamb stud. Coordinate as required.
 - L. Miscellaneous Angles: Sizes and shapes as detailed. Use specified galvanized steel for angles at exterior conditions.
 - M. Below and Above-Ceiling Supports: Construct of Unistrut members or as approved by Architect to size and shape detailed. All work shall be accurate to +/-1/8 inch. Provide supports complete with fastenings to structure for overhead equipment.
 - a. provide P5500 12ga 1 5/8”x 2 7/16” suspended on 3/8” all thread min.
 - O. Trench Covers and Frames: Balco Type TST Series interior trench frame and cover suitable for insertion of VCT finish flooring. Aluminum plate shall be minimum 1/4 inch thick with a recessed design to accept VCT floor tile. Frame shall be set 1/8 inch above concrete floor so that the finished top is flush with the finished VCT floor.
 - 01 Additional Acceptable Manufacturers:
 - a. Architectural Art Manufacturing
 - b. MM Systems Corp.
 - c. or equal

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- P. Ceiling Hung Equipment Supports: Provide supports and trim as indicated at in drawings.
- Q. Miscellaneous Items: Miscellaneous metal items and their related components are not necessarily individually described. Miscellaneous items not described shall be furnished and installed in accordance with the intent of the drawings and specifications, and as required to complete the work.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Separate all dissimilar metals.
- B. Where welding is exposed to view, welds shall be executed neatly then ground smooth. Pits and blemishes are not acceptable.
- C. For manufactured items, adhere to printed manufacturer's installation instructions.
- D. Refer to Painting Section for items that are to receive paint.

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SECTION 06 10 00

ROUGH CARPENTRY

CONDITIONS OF THE CONTRACT AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Supplementary Condition for substitutions.

1.2 SUBMITTALS

- A. Test Reports: Certified test reports showing compliance with the specified performance characteristics and properties.
- B. Certificates: Certification from the treatment plant certifying wood treatment applied complies with the criteria and physical requirements for ACQ preservative-treated wood products as specified herein.

1.3 STANDARDS AND GRADING

- A. All lumber used structurally shall be graded and marked with grade and trademark of a lumber grading organization approved by the Architect, except that a certification of grade from such a grading organization may be accepted in lieu of grade and trademarks when approved by the Architect. Trademark of manufacturer shall also appear on each piece.
- B. Each piece of plywood used structurally shall carry the American Plywood Association trademark.
- C. Grading Rules: Conform with all applicable requirements of American Lumber Standards "Simplified Practice Recommendations R-16" and to grading rules of manufacturer's association under whose rules the lumber is produced.
- D. Reference Standards: (Conform with all requirements)
 - 01 Southern Pine Council (SPA)
 - 02 U.S. Dept. of Commerce Product Standards
 - 03 American Wood Preservers Assoc. Standards (as they apply)
 - 04 Architectural Woodwork Institute "Quality Standards"
 - 05 Western Wood Products Association Manual

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Lumber:
 - 01 Treated No. 2, S4S Southern Yellow Pine
 - a. Alkaline Copper Quaternary (ACQ). Comply with AWPA Standards

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- b. Use for blocking, stripping, grounds, cants and miscellaneous wood items in contact with concrete, roofing, all exterior wall locations and where exposed to the weather. Use as treated blocking at all conditions where cement siding, soffits and soffits are shown
 - 02 No. 2, S4S Southern Yellow Pine: Use for framing, blocking, stripping and miscellaneous concealed interior lumber not exposed to concrete, roofing weather or moisture, when FRS lumber is not required by building code.
 - 03 Fire Retardant No. 2, S4S Southern Pine: Lumber shall be pressure-impregnated with non-combustible fire retardant chemicals in accordance with U.L. FRS Fire Hazard Classification. All lumber must be dried following treatment in accordance with AWPA Standard C-20. Use for framing, plates and blocking in all walls and partitions where required by building code or noted on drawings.
 - B. Plywood:
 - 01 General: Comply with APA Standards
 - 02 APA A-D, Group 1 Interior used where appearance of only one side is exposed to view for interior locations.
 - 03 Exterior plywood, Group 1, APA rated sheathing. Use where miscellaneous plywood is exposed to concrete or weather.
 - 04 Fire Retardant Treated Plywood - with pressure-impregnated non-combustible fire retardant chemicals in accordance with U.S. FRS Fire Hazard Classification, AWPA Standards C-27. Use when required by building code or noted on drawings.
 - C. Rough Hardware:
 - 01 Fasteners used in ACQ treated material shall be hot-dipped galvanized fasteners complying with ASTM A153 and connectors complying with ASTM A653; or Type 304 or Type 316 stainless steel fasteners and connectors, as recommended by the treatment manufacturer.
 - 02 Nails, Spikes, and Staples: Hot-dipped galvanized for exterior locations, high humidity locations, and treated wood; plain finish for other interior locations: Size and type to suit application.
 - 02 Bolts, Nuts, Washers, Lags, and Screws: Medium carbon steel; size and type to suit application. Hot-dipped galvanize for exterior locations, high humidity locations, and treated wood. Plain finish for other interior locations.
 - 03 Fasteners: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry and concrete. Bolts or power activated type for anchorage to steel.
 - D. Treated Wood Isolation:
 - 01 All ACQ treated material shall be installed with an isolation sheet between the wood and adjacent metal surface. Provide 15 lb. asphalt impregnated building felt or other isolation material as recommended by the treatment manufacturer.
 - E. Telephone / Technology Board
 - 01 Use grade stamped DFPA, grade A/D.
 - 02 Provide 4' x 8' sheets of 3/4 inch plywood for telephone boards in mechanical; telephone rooms where needed.

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- 03 Provide 3/4 inch plywood up to 8'-0" above finish floor behind finished gyp board at all walls of the technology "DATA".
- 04 Where exposed, paint as scheduled in Section 09 90 00

PART 3 - EXECUTION

- A. Blocking Locations:
 - 01 Provide wood blocking at all built-in work, in walls for anchoring cabinets, and other locations as indicated on the drawings.
- B. Wood Framing:
 - 01 Not Used
- C. Plywood:
 - 01 Install plywood over framing in accordance with instruction of American Plywood Association Construction Guide Form No. E30C.
 - 02 Install underlayment plywood as shown in accordance with instructions of American Plywood Association. Space panel joints and edges 1/32 inch. Fill and sand panel edge joints, surface roughness, and damaged or open areas. Nail with four (4) ring-shank nails spaced at 6 inches at edges and 8 inches in field each way.

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SECTION 06 18 00

GLUE LAMINATED TIMBERS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Product Data: Wood treatment materials.
- C. Submit complete shop drawings showing necessary details, layouts, plans and other pertinent data. Do not proceed with fabrication until approval by the Architect and Structural Engineer has been obtained.
- D. Submit samples of finished wood for approval.

1.3 QUALITY CONTROL

- A. Manufacturer of the structural glued laminated timber shall be by an experienced fabricator with not less than 10 years experience and shall conform to the manufacturing requirements of the Standard Specifications for Structural Glue Laminated Southern Yellow Pine and The American Institute of Timber Construction Standards. ANSI/A.I.T.C. A190 1-1992 Specifications shall be adhered to completely. Quality Control shall be provided in accordance with A.I.T.C. 200-93. A Certificate of Conformance to these requirements shall be furnished by the fabricator and the A.I.T.C. quality mark shall appear on all principal members.

1.4 RELATED WORK

- A. Refer to Structural Drawings and Specifications

1.5 REFERENCE: AITC 117 "Design Standard Specifications for Structural Glue Laminated Timber of Softwood Species.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Unit Structures, Inc. supplied by R.M. Rodgers, Inc. (800) 392-0629; (713) 666-2229
- B. Unadilla Laminated Products (607) 369-9341

2.2 MATERIALS: (Southern Pine No Exceptions)

- A. Glued Laminated Timber: Laminated lumber shall be kiln dried Southern Pine which meets the structural requirements and the Standard Specifications for Structural Glued Laminated Southern Pine. Lumber shall be of such stress grade as to provide glued laminated members with normal working stress values of 200 psi in shear parallel to grain, 1,800,000 psi in modulus of elasticity, 2,400 psi in

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bending 1,600 psi in tension, and 1,500 psi in compression parallel to grain. Wet-use adhesives (waterproof) shall be used.

- 2.3 **ADHESIVES:** Adhesives shall be waterproof, conforming to Military Specifications MIL-A-397B and ANSI A190.1.
- 2.4 **HARDWARE:** The fabricator shall furnish connections for joining laminated members to each other and/or supports, except anchor bolts embedded in masonry, tie rods, setting plates, or items welded to structural steel. All connections to be hot dipped galvanized. The Manufacture shall design all laminated members according to A.I.T.C recommendations.
- 2.5 **APPEARANCE GRADE:** The appearance of members shall be as defined Standard Appearance Grade for Structural Glued Laminated Timber, A.I.T.C. 110-84 and shall be Premium grade.
- 2.6 **FINISH:** Members are to be fabricated with the manufacturers standard semi-transparent wood stain. Color to be selected by Architect.
- 2.7 **PRESERVATIVE TREATMENT:** All laminated wood members shall be pressure treated with pentachlorophenol prior to gluing to .3 lbs. retention. Treatment is to be in accordance with A.I.T.C. 109, AWPA C28. All treated material to be kiln dried to a moisture content of 15% or less prior to gluing. Retention of material to be guaranteed by Random Assay Samples from Treating facility.
- 2.8 Provide stainless steel (grade 304) fasteners, bolts, anchors, screws and miscellaneous accessories for conditions exterior subject weather.

PART 3 - EXECUTION

- 3.1 **PROTECTION:** All laminated wood members to be individually wrapped.
- 3.2 **ENGINEERING AND DESIGN REQUIREMENTS:** Sizes of laminated wood members, metal connections as indicated on the plans are minimum sizes. (No section size shall be less than what is designated). The laminated wood manufacturer shall be responsible for the design of such items and shall insure the integrity of these items by applying the Seal of a Texas Registered Engineer on the final material shop drawings and furnishing sealed calculations for the laminated beams. Sealed calculations for the laminated wood members shall be submitted to the Architect and Structural Engineer Project for approval prior to receiving proposals of this project, no exceptions taken.
- 3.3 **ERECTION:** Erection to be by R.M. Rodgers, Inc. or a factory approved installer for Unadilla Laminated Products and Structural Wood Components. Provide protection of all materials associated with work after arrival on jobsite. Provide any touch-up work required on factory finishes.

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SECTION 06 22 00

FINISH CARPENTRY AND MILLWORK

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1- GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.
- B. Related Work:
 - 01 Section 06 10 00 - Rough Carpentry

1.2 SCOPE OF WORK

- A. Finish Carpentry
- B. Millwork
- C. Plastic Laminate
- D. Installation of finish hardware and plastic laminate doors.

1.3 SUBMITTALS

- A. Manufacturer's specifications and other data for all products proposed to be furnished as needed to prove compliance with specified requirements.
- B. Shop Drawings: Indicate size, material, veneer, and AWI grade construction details. Show locations and installation procedure of each millwork item. Includes details of joints, attachments, and clearances.
- C. Manufacturer's installation instructions.
- D. Samples:
 - 01 Submit full range of colors, patterns, and textures for plastic laminate for Architect's selection.
 - 02 Submit representative, minimum 18" samples of all hardwood proposed to be furnished
 - 03 Submit samples of range of stains on actual hardwood samples.

1.4 MINIMUM COMPLIANCE STANDARDS

- A. The "Quality Standards of the Architectural Woodwork Industry" governs the work, except where more restrictive items are specified.

PART 2 - PRODUCTS

2.1 PLASTIC LAMINATE

- A. Thickness: Horizontal grade for all finished / exposed surfaces. Vertical grade may be used for cabinet interiors only. Use .020 balance sheet.
- B. Pattern Finish Selection: As selected by Architect
- C. Pattern Range: Include all standard colors

- D. Acceptable Manufacturer:
 - 01 Wilsonart - Ralph Wilson Plastic Co.
 - 02 Formica - The Formica Corporation

2.2 SOLID STOCK

- A. Moisture Content: Percent of moisture in relation to over-dry weight shall be between 8% and 13% at time of installation.
- B. Natural Finish Hardwood: Red Oak. Comply with AWI "Premium" Grade.
- C. Paint Grade Hardwood: Any species, including poplar. Do not use Oak, Elm or similar species which have coarse grain.

2.3 HIGH PERFORMANCE CORE MATERIAL:

- A. All core materials shall be an Industrial Grade particleboard which shall meet or exceed performance requirements for ANSI A208.1-1999 M3 Standards.
- B. All core materials shall be 3/4" material; minimum 45 lb. density.
- C. All core materials shall have a minimum 250 lb. screw holding capacity on the face plane and minimum 225 lb. screw holding capacity on the edge plane.
- D. Edging types. 3 mm thick PVC. Solid, high-impact, purified, color-thru, acid resistant, pre-lamination primed edging, machine-applied with hot melt adhesives, automatically trimmed, inside/outside length-radiused for uniform appearance, buffed and corner-radiused for consistent design.

2.4 MISCELLANEOUS

- A. Utility shelving: AWI "Economy" grade

2.5 CABINET HARDWARE

- A. Hinges. Heavy-duty chrome-plated steel, 5 knuckle, equal to McKinney No. 2758-US D finish (color selected by Architect), wraparound type allowing 270-degree swing at end of unit attached with No. 10-24 sheet metal screws, or approved substitution.
- B. Pulls. 4-1/2 inch extruded aluminum with color selected by Architect.
- C. Catches. Spring actuated, nylon roller type.
- D. Adjustable Shelf Supports. 13-gauge angle, 1/2 inch wide, with 1/4-inch diameter by 3/8-inch long pin, bright zinc-plated and all edges rounded.
- E. Locks. 5-pin tumbler, heavy-duty cylinder type with provision WCC grandmaster keying and per room sub master keying.

2.6 PLASTIC LAMINATE BLOCK PANELING

- A. Provide plastic laminate finished block paneling in sizes and patterns as indicated on the drawings.
 - 01 3/4" high-pressure core material body.
 - 02 Horizontal grade plastic laminate faces with 0.020 balanced backs.

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03 Faces of block paneling shall have no seams or splices.

- B. A maximum of three (3) plastic laminates and 3-mil PVC edging shall be selected for application.
- C. Block paneling shall be suspended / hung on wall using 1x4 blocking attached to wall and back of panel to provide 3/4" relief off wall. Provide at two locations each panel.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Positioning: Place approximately level, plumb and at right angles to adjacent work. Maintain consistent spacing between elements where indicated on the drawings.
- B. Fitting: Where field cutting or trimming is necessary, perform in a neat, accurate, professional manner without damaging the products and adjacent work.
- C. Anchorage: Attach securely so the products will perform to their maximum ability without damage from inadequate fastenings.
- D. Fasten tops to frames with concealed clips, screws and glue.

3.2 PLASTIC LAMINATE DOOR INSTALLATION

- A. Carefully verify that doors are properly installed at intended door location and that door prep for finish hardware is accurate and complete.
- B. Install all doors plumb and square to frame with +/- 1/8" clearance between door and frame.
- C. Install finish hardware in accordance with approved templates.
- D. Verify that top and bottom rails are sealed prior to door installation.
- E. Take all necessary precautions to protect door finishes before, during and after installation. In the event of damage to the plastic laminate surfacing, replace door.
- F. Upon completion of door installation, cycle door several times to confirm that door, frame and hardware are all installed and functioning correctly.

3.3 FINISH HARDWARE INSTALLATION

- A. The supplier will mark each item hardware for location. Protect the markings until each item is installed. If any item is delivered to the job not properly marked, return it to the supplier for marking before attempting to install it.
- B. Check markings on hardware for proper location. Install and make necessary adjustments for proper working order. Any hardware damaged by improper adjustment or careless abuse will be replaced by the Contractor at his expense.
- C. Provide clean, properly sized and accurately placed mortises and drilled holes for all mortise hardware such as locksets and for cylindrical locks where specified only.
- D. Accurately fit all surface-applied hardware.
- E. After hardware is installed, protect exposed surfaces by use of heavy paper and masking tape and maintain until job completion.

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- F. Remove all finish hardware except that which is primed for painting before painter's finish is applied. Permanently replace and re-adjust for proper function after painter's finish has dried hard.
- G. Do not strip heads of Phillips head screws. Remove and replace all stripped or damaged screws.
- H. Finish Hardware – Cabinets shall have all hardware furnished.

END OF SECTION

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SECTION 07 10 01

DAMPPROOFING AND THRU-WALL FLASHING

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Bidders for substitutions.
- B. Dampproofing shall be applied to exterior of all gypsum sheathing and other locations where indicated to provide a continuous dampproofed surface on the buildings exterior wall.

1.2 SUBMITTALS

- A. Manufacturer's specifications and other data needed to prove compliance with specified requirements.
- B. Certification of compatibility with rigid insulation specified in Building Insulation - Section 07 21 13.
- C. Manufacturer's certificate that product contains no asbestos.
- D. Manufacturer's installation instructions; including shop drawings where necessary to detail special conditions.
- E. Sample Panel: Sample panel shall be 4' long x 4' high panel showing completed through-wall flashing at first course of masonry and dampproofing assembly, complete with exterior sheathing, rigid insulation (where applicable). Coordinate as required with other trades.
 - 01 Panel shall be "L" shaped (4' x 4') with metal stud / drywall back-up wall on one side and CMU back up on one side. Install
 - 02 Once accepted by the Architect, the sample panel shall be the standard by which installed is judged.
 - 03 Sample panel shall remain at the jobsite until all through-wall flashing and dampproofing is completed.

1.3 WARRANTY

- A. Refer to Section 01710 - Guarantees, Certificates and Close-Out
- B. Provide a material and labor, non-prorated, manufacturer's / installer minimum two (2) year warranty that material and installation shall remain watertight.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Flexible Flashing: Self-Adhered- flexible flashing product consisting of pliable, adhesive rubberized- Asphalt compound, bonded to high-density, cross-laminated polyethylene film producing a minimum thickness of 40 mils.

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- B. Thru-Wall Flashing (below all weepholes):
 - 01 Self-Adhered: flexible flashing product consisting of pliable, adhesive rubberized- Asphalt compound, bonded to high-density, cross-laminated polyethylene film producing a minimum thickness of 40 mils.

2.2 MANUFACTURERS

- A. Products for Flexible flashing:
 - 01 Carlisle Coatings & Waterproofing: CCW-705 Air & Vapor barrier strips
 - 02 Grace Construction products: Perm-A-Barrier Detail Membrane
 - 03 Henry: Blueskin SA
 - 04 or Equal
- B. Products for Thru-Wall Type:
 - 01 Carlisle Coatings & Waterproofing: CCW-705 TWF
 - 02 Grace Construction Products: Perm-A-Barrier wall flashing
 - 03 Henry: Blueskin TWF
 - 04 or Equal

2.3 LOCATIONS

- A. At gypsum sheathing, steel columns and beams in exterior walls, and elsewhere, as indicated on the drawings. Apply primers and or adhesive as required by Manufacturer.
- B. Install as base flashing at all exterior cavity walls and stone veneer, Lintels, all doors, windows & exterior penetrations.

2.4 THRU-WALL FLASHING

- A. By definition for work covered by this section, “thru-wall flashing” shall refer to all flexible flashing installed at both through-wall and non-through-wall conditions. Metallic thru-wall flashing shall be as specified in section 07620.
- B. Flexible, Self-Sealing Wall Flashing
 - 01 Description: Self adhering, membrane consisting of an SBS rubberized asphalt compound which is integrally laminated to a cross laminated polyethylene (HDPE) film, with a silicone release sheet, specifically designed for thru-wall flashing conditions.
 - 02 Width: Select either 12 inch, 18 inch, 24 inch, 36 inch wide rolls as applicable for field conditions
 - 03 Thickness: 40 mils.
 - 04 Elongation: 200% minimum (ASTM D412 Die C)
 - 05 Water vapor transmission: 0.05 perms (ASTM E96 Method B)
 - 06 Membrane tensile strength: 800-psi minimum.

2.5 THRU-WALL FLASHING MANUFACTURERS

- A. These specifications are based on the first listed product. Refer to each of the manufacturer’s literature for specific installation requirements.
 - 01 Henry Company #798 Blueskin TWF.
 - 02 Tremco ExoAir TWF
 - 03 Grace Construction Product “Perm-A-Barrier”
 - 04 Polyguard Products, Inc. “Polyguard 400”

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05 Durowall, Inc “Duro-O-Barrier 44”.

- B. Provide primers, glass fabric scrim tape, mastic and other materials not specifically described, as required for a complete and proper installation as recommended by the manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Working Conditions: Apply under normal working conditions above 45°F and rising. Do not apply when rain is imminent.
- B. Storage: Keep container tightly sealed and protect from freezing in shipping and storage.
- C. Surface Preparation:
 - 01 All dust, dirt, old loose or scaling coatings shall be removed from the surface before coating or application of thru-wall flashing.
 - 02 All brick ledge conditions shall be free of dirt and dust prior to application of thru-wall flashing.
 - 03 All cracks, joints, penetrations, and splits should be sealed, repaired with 4-inch wide glass fabric scrim tape embedded in Henry Company #789.
 - 04 Dusty or porous masonry surfaces should be dampened with water. Highly porous masonry should be primed with Henry Company #788 Asphalt Primer or #351 Non-fibered Emulsions which has been thinned with 1 gallon water per 5 gallons of #788.
 - 05 Metal surfaces shall be free of rust, cleaned and primed.
 - 06 Architect shall approve the taping of joints and surface preparation prior to the application of the dampproofing.

3.2 LOCATIONS

- A. Thru-Wall Flashing
 - 01 All foundation masonry / brick ledges. At locations where adjacent concrete flatwork is above the bottom of the brick ledge, two (2) layers shall be applied – one at base of brick ledge and one at the first brick course above the adjacent flatwork.
 - 02 Overheads of openings on steel lintel angles back to wall sheathing / substrate.
 - 03 Under sills and at jambs of openings (not thru wall). Install additional thru-wall flashing at window jambs to lap over the end dams of all sub-sill flashing. Coordinate with window installer as required.
 - 04 At perimeter of building at rooflines and parapets (not thru wall) extending down onto exterior walls (sheathing or CMU as applicable).
 - 05 At all exterior wall conditions as required to divert moisture within wall cavities to the building exterior.
 - 06 At all openings through exterior sheathing / CMU resulting from structural steel or other interfacing work.
 - 07 Where indicated on drawings.

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- B. Air and Vapor Barrier: Continuous at the exterior Gypsum sheathing, Plywood, masonry or other materials that may be present to provide a complete coating on the exterior wall, less openings for doors, windows, or equipment.
- C. The completed installation of thru-wall flashing and Air & Vapor Barrier shall render the building water tight except at door and window openings

3.3 INSTALLATION – THRU-WALL FLASHING

- A. Install all thru-wall flashing and dampproofing in strict accordance with the manufacturer’s specifications and recommendations.
 - 01 Take all necessary precautions to eliminate fish-mouths and other irregularities. Where they occur, cut out and apply additional layer(s) of thru-wall flashing as required to achieve a smooth surface.
 - 02 Carefully construct corner assemblies and vertical transitions / steps to assure proper lapping of adjacent sheets to provide positive drainage. Lap joints shall be a minimum of 4 inches.
 - 03 All thru-wall flashing shall be installed prior to application of damp proofing.
- B. Do not extend thru-wall flashing at masonry / brick ledges and lintels to face of masonry. Cut back 1/2" to 3/4" from exterior face.
- C. Carefully coordinate with the masonry contractor to install thru-wall flashing at the proper brick course(s). Thru-wall flashing shall form a continuous barrier at all transitions.

3.4 INSTALLATION - DAMPPROOFING

- A. Install Air & Vapor Barrier over the entire surface in strict accordance with Manufacturers written manuals.
- B. Insure continuous coating free of breaks, voids and pinholes.
- C. Air and Vapor Barrier shall lap over edges of thru-wall flashing membrane a minimum of 2 inches, provide mastic as applicable per manufacturers written specifications.
- D. Thoroughly cover all cracks, joints, and corners.
- E. Do not bridge over holes or other defects in the exterior sheathing larger than 1/2 inch in diameter / size. Sheathing shall be cut out and patched as required.
- F. The completed installation shall completely envelop the exterior (cavity) wall producing a completely dried-in condition.

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SECTION 07 21 13

BUILDING INSULATION

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.
- B. This Section includes rigid board cavity wall insulation and batt insulation used in stud walls.

1.2 SUBMITTALS

- A. Comply with Section 01 33 00
- B. Submit product literature for all products proposed to be furnished.
- C. Certify compatibility of rigid insulation with dampproofing mastic.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Batt or Roll Thermal Insulation:
 - 01 R-Values (minimum): R-19 at exterior walls.
 - 02 Comply with Type 1 ASTM 665-84 unfaced
 - 03 Flame Spread 25 or less
 - 04 Pins and disc securement accessories as required.
 - 05 Unfaced.
- B. Batt or Roll Acoustical (Sound Attenuation) Insulation:
 - 01 Sound Attenuation Insulation: USG "Thermafiber" or Owens/Corning "R-8" noise barrier batt sound attenuation blankets, 2-inch thickness, friction fit between studs.
 - 02 Pins and disc securement accessories as required.
 - 03 Unfaced.
- C. Rigid Board Insulation
 - 01 1" thick at all exterior walls
 - 02 Largest width practical for handling onsite
 - 03 Thermal resistance R-6.0 per inch minimum
 - 04 Water vapor transmission < 0.3 perm
 - 05 Compressive strength 20 p.s.i. minimum
 - 06 Verify compatibility with damp proofing mastic.
 - 07 Four (4) Foot by eight (8) foot sheets minimum size or largest practical size
 - 08 R-Seal Construction tape, pressure sensitive adhesive at joints and fastener heads.

2.2 MANUFACTURERS

- A. Batt or Roll (thermal):
 - 01 Owens-Corning
 - 02 Manville
 - 03 Certained
 - 04 United States Gypsum

- 1 05 Guardian Building Products
- 2
- 3 B. Batt or Roll (acoustical):
- 4 01 Owens-Corning
- 5 02 Manville
- 6 03 Certaineed
- 7 04 United States Gypsum
- 8 05 Guardian Building Products
- 9
- 10 C. Rigid Board Insulation & Joint Tape:
- 11 01 RMax Therma Sheath - 3
- 12 02 Or Equal

13 **PART 3 - EXECUTION**

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16 **3.1 INSTALLATION**

- 17
- 18 A. Batt or Roll Thermal Insulation:
- 19 01 Batts shall fit between studs and provide full coverage at exterior
- 20 walls.
- 21 02 Wall Areas Above Ceiling: At insulation in ceiling cavity under roof
- 22 deck fasten batts at intervals necessary for batts to remain in
- 23 place. Install blankets with long dimensions running vertically
- 24 between rafters, keeping blankets tight to exterior wall without
- 25 crushing.
- 26 03 On the exterior side of all structural steel located directly behind
- 27 sheathing
- 28
- 29 B. Batt or Roll Acoustical Insulation:
- 30 01 Place acoustical insulation in partitions tight within spaces,
- 31 around cut openings, behind and around electrical and
- 32 mechanical items within or behind partitions and tight to items
- 33 passing through partitions.
- 34
- 35 C. Rigid Board Insulation
- 36 01 Install board insulation at exterior walls in accordance with
- 37 manufacturer's printed instructions. Where applicable, Do not
- 38 bend or alter masonry ties to secure rigid insulation in place.
- 39 02 Install board insulation on sheathing at all wood framed walls
- 40 where indicated on the drawings.
- 41 03 Secure insulation boards to back up surface with fasteners or
- 42 adhesive and with joints tight to provide full coverage.
- 43 04 Cope / cut insulation as required to fit irregularities and
- 44 obstructions as required to achieve full coverage.
- 45 05 Take precautions to assure that insulation board is concealed
- 46 within cavity wall construction.
- 47 06 Seal all joints, penetrations, and fastener heads with approved
- 48 pressure sensitive tape.

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51 **3.2 PROTECTION**

- 52
- 53 A. Upon completion of batt insulation, use all means necessary to protect
- 54 material from becoming wet.
- 55 01 In the event batt or acoustical insulation comes in direct
- 56 contact with moisture or becomes wet, remove and discard, and
- 57 replace insulation with dry material.

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02 In the event batt insulation becomes damp or moist, thoroughly dry insulation prior to covering up.

03 Use all means necessary to assure that batt and acoustical insulation is completely dry at the time of cover-up and will not promote the growth of mold.

B. Protect rigid insulation as required to prevent damage and delamination.

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SECTION 07 42 00

METAL WALL PANELS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.01 CONDITIONS

- A. The General and Special Conditions of these specifications shall both be considered as a part of this Section insofar as they may be termed applicable, whether attached or not.
- B. Cooperation by Contractor for work of this Section of the Specifications with all other trades is mandatory, so that all phases of work may be properly coordinated without delays or damage to any parts of any work.
- C. The Contractor shall provide all items, articles, materials, operation, or methods listed, mentioned or scheduled on the drawings and/or herein, including all labor, material, equipment and incidentals necessary and required for their completion.

1.02 WORK INCLUDED

- A. Work under this section of the specification shall include all labor, materials, equipment and appurtenances for the installation of Metal wall panels as indicated on the drawings and herein specified. To include all components and parts of the building (consisting of necessary bracing, struts and connecting members), wall panels, flashing curbs, gutters and downspouts, all with necessary closures and fasteners.
- B. Installation of metal "Z" furring strips or hat channel for attachment of panels over/through rigid insulation.

1.03 SHOP DRAWINGS

- A. The manufacturer shall furnish complete drawings showing flashing details, and necessary installation details to clearly indicate the proper assembly of all building wall panels.

PART 2 - PRODUCTS

2.1 PRE-ENGINEERED BUILDING MANUFACTURERS

- A. The following manufacturers have been approved:
 - 01 Centria Concept Series, Metal Wall Panels.
 - 02 or Equal

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3 **PART 3 - EXECUTION**

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5 **3.01 WALL PANELS**

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7 A. General

8 01 Typical wall panels shall be 26 gauge galvanized steel cold-formed panels.

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10 B. Panel Materials

11 01 Material for galvanized steel panels shall conform to ASTM
12 Specification for 50,000-PSI Yield Class C-90.

13
14 C. CS-660 Panels- to be used for wall panels or similar profiles.

15 01 Finish: Duragard

16 02 Color: Slate Gray 181

17 03 Corner Trim: Mitered microseam corner

18 04 Associated Trim and Flashing to match panel finish

19 D. Fasteners

20 01 All self-tapping sheet metal screws. Where required for weather
21 tightness, screws shall be equipped with metal and EPDM washers.

22 02 Optional self-drilling fasteners shall be No. 12-1 Type B self-drilling screw
23 with non-walking point and two-step thread to insure maximum stripout
24 torque in panel-to-panel usage.

25 03 After plating, all exposed fasteners and washers shall be coated with one
26 prime coat and two finish coats of baked silicone polyester. The color of
27 the finish shall match the wall and/or roof panels.

28 04 Screws and washers shall be carbon steel plated with .003" thick zinc or
29 cadmium.

30
31 E. Sealer

32 01 Sealer for sidelaps, endlaps and flashing shall be asbestos fiber-filled,
33 pressure sensitive tape. The sealer shall be non-asphaltic, non-shrinking,
34 non-drying, and non-toxic and shall have superior adhesion to metals,
35 plastics, and painted surfaces at temperatures from 30° to -160° F. The
36 material shall have a flashpoint of at least 300°F., and shall not flow at
37 200°F., equal in performance to Gov. Spec. No. MIL-C-18969, Type II, Class
38 B.

39 a. ½" wide x 3/32" thick

40
41 F. Wall Panel Installation

42 01 Wall panels shall be installed in accordance with manufactures written
43 specification

44 02 Wall panels shall be installed over 7/8" hat channel or fabricated "Z" metal
45 for attachment through/over rigid insulation. Coordinate gauge
46 requirements with manufacturer.

47
48 G. Flashing, Closures and Trim

49 01 Flashing and/or trim shall be furnished at the rake, corners, and eaves; at
50 reamed openings, and whenever necessary to provide weather tightness
51 and a finished appearance.

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- 02 Galvanized steel for flashing, metal closures, trim and other miscellaneous uses shall conform to ASTM Specification A-361, Class G90.
- 03 A formed panel matching the slope and profile of adjoining panels shall be provided along the building ridge.
- 04 Solid or closed cell, performed Ethylene-Propylene Diene-Monomer (EPDM) or Ethylene Propylene Teroploymer (EPT) color gray, matching the profile of the panel shall be installed along the rake and/or eave where required for weather tightness.

H. Eave Gutters and Downspouts

- 01 Eave gutters shall be 26 gauge-galvanized steel. Snap-on gutter straps shall be provided for ease in erection at a maximum spacing of 5'. Design of the gutter will permit rapid installation or removal after roof and wall sheets are in place. Gutter shall screen from view the eave ends of roof sheets. No portion of the gutter will protrude under the roof panels.
- 02 Downspouts shall be 26-gauge galvanized steel rectangular shaped. Downspouts shall connect with boots and shall be supported by attachment to the wall covering at 10' maximum spacing.

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SECTION 07 54 23

THERMOPLASTIC SINGLE PLY MEMBRANE ROOFING

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

A. Refer to Instructions to Proposers for substitutions.

1.2 QUALITY ASSURANCE

A. Reference Standards:

- 01 American Society for Testing and Materials (ASTM)
 - a. C-920 Specification for Elastomeric Joint Sealants
 - b. D-751 Specification for Testing Coated Fabrics
 - c. D-1149 Test for Rubber Deterioration - Surface Ozone Cracking in a Chamber (Flat Specimens)
 - d. D-1204 Test for Linear Dimensional Changes of Non-Rigid Thermoplastic Sheeting or Film at Elevated Temperature.
 - e. D-1621 Test for Compressive Properties of Rigid Cellular Plastics.
 - f. D.2136 Specification for Testing Coated Fabrics, Low-Temperature Bend Test.
 - g. E-96 Tests for Water Vapor Transmission of Materials
 - h. E-108 Specification for Fire Tests of Roof Coverings.
 - i. E-838 Practice for Performing Accelerated Outdoor Weathering Using Concentrated Natural Sunlight.
 - j. G-21 Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- 02 Federal Specifications:
 - a. 101B
 - b. 191
 - c. TT-S-00230C
 - d. HHI 1972
- 03 Factory Mutual - FM1-90
- 04 Underwriter's Laboratories, Inc.
 - a. Class A Materials

B. Roofing systems must be applied by roofing contractors authorized, trained and licensed by the membrane manufacturer and approved by the Architect.

C. Upon completion of the installation, an inspection shall be made by the manufacturer to ascertain that the roofing system has been installed according to the applicable specifications and details.

D. There shall be no deviation made from this specification or the approved shop drawings without prior written approval by the manufacturer and Architect.

E. Product Delivery, Storage and Handling:

- 01 Deliver materials in original, unopened containers/packaging.

- 1 02 Containers are to be labeled with manufacturer's name, brand name,
- 2 installation instructions and identification of various items.
- 3 03 All materials, except membrane must be stored above 60°F. If exposed to
- 4 lower temperature, restore materials to 60°F minimum temperature before
- 5 using.
- 6 04 All materials must be stored in a dry area and protected from water and
- 7 weather. All materials, except membrane, must be protected from direct
- 8 sunlight. Damaged materials shall be replaced at roofing contractor's
- 9 expense.

11 F. Site Conditions (Environmental Requirements):

- 12 01 Apply roofing in dry weather.
- 13 02 Do not apply roofing when ambient temperature is below 40°F.

15 **1.3 SUBMITTALS**

17 A. To Architect/Owner:

- 18 01 Product Data: Within four weeks of award of contract, submit:
 - 19 a. Shop drawings showing joint layout indicating maximum use of
 - 20 sheets with a minimum of joints and field splicing. Include details of
 - 21 fabrication and construction of joints, flashing, etc.
 - 22 b. Submit minimum of two samples of sheet material and descriptive
 - 23 literature.
 - 24 c. Manufacturer's specifications and other data needed to prove
 - 25 compliance with specified requirements.
 - 26 d. Provide all other data and information to satisfy requirements of
 - 27 manufacturer on warranty needs.
 - 28 e. A written statement from the roofing materials manufacturer
 - 29 approving the installer and stating the intent to guarantee the
 - 30 completed project.
 - 31 f. Samples of proposed warranty complete with any addenda
 - 32 necessary to meet the warranty requirements as specified.
 - 33 g. The roofing manufacturer for all systems listed must present
 - 34 written evidence that the roofing system is a Class "A" fire rated
 - 35 assembly and that the system is recognized by Factory Mutual as
 - 36 passing the Class 1-90 wind uplift resistance test.

38 B. To Roofing Manufacturer:

- 39 01 Shop drawings must be submitted to roofing manufacturer for approval.
- 40 02 Approved shop drawings are required for inspection of the roof.
 - 41 a. Shop drawings shall be approved and assigned a number by the
 - 42 roofing manufacturer.
 - 43 b. Shop drawings shall include:
 - 44 01 Outline of roof and size
 - 45 02 Location and type of all penetrations
 - 46 03 Perimeter and penetration details
 - 47 04 Sheet layout and sizes
 - 48 05 Number of flashing rolls by width
 - 49 06 Insulation manufacturer, brand and thickness
 - 50 07 Fastener length
 - 51 08 Warranty type and period
 - 52 09 Completely executed Notice of Award
 - 53 10 Deck type

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11 Roof slope and designated direction of slope

03 When field conditions necessitate modifications to the originally approved shop drawings, a copy of the shop drawing outlining all modifications shall be submitted for approval.

1.4 PRE-INSTALLATION CONFERENCE

A. Refer to Section 01420 - Notification of Architect Requirements.

1.5 WARRANTY

A. Twenty year warranty: The complete roofing systems shall be guaranteed for a minimum of twenty years from date of Substantial Completion for this project, no dollar limit. Guarantee responsibilities shall be as follows:

- 01 Roofing contractor shall guarantee the roofing system for a period of two years from date of Substantial Completion.
- 02 Materials manufacturer shall continue the guarantee for an additional eighteen years.
- 03 The roof system including flashings shall be guaranteed against failure of workmanship and materials. Repair of the system, including materials and labor, shall be performed at no cost to the Owner.

B. During the proposal period, each proposer shall make arrangements with the materials manufacturer to provide the required warranty. Final warranty shall be submitted to Owner at time of Substantial Completion.

1.6 JOB CONDITIONS

A. Environmental Conditions: In making field heat welds, make sure all welding surfaces are clean and free of moisture, contaminants or foreign items.

B. Protection:

- 01 Prior to starting work, protect all work in an approved manner including all paving and faces of the building walls. Provide special protection of the faces of the building wall, adjacent to the hoist.
- 02 Complete the whole roofing section or any portion of the roof in a single working day to avoid exposure to rain, dew, or moisture of any kind. If inclement weather threatens during the day or in an emergency, protect the unfinished exposed roofing components and provide temporary water cut-offs around exposed edges and incomplete flashing areas.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Membrane components to be products of the membrane manufacturer. No substitutions shall be accepted.

B. Membrane:

- 01 A special formulated, permanent, thermoplastic alloy, bonded to a high tenacity, low shrinkage weft inserted polyester fabric with resistance to ultraviolet rays, microorganisms and impervious to most caustic chemicals.

02 Membrane shall be factory dielectrically welded prefabricated sheets up to 2,500 square feet, or as determined by job conditions.

C. Membrane-Related Materials:

- 01 Flashings: Shall be prefabricated from 60 mil reinforced roofing membrane, furnished by membrane manufacturer.
- 02 Termination Sealant: Compatible with materials to which the membrane is to be bonded, conforming to Federal Specifications TT-C-598 and TT-S-0023OC, as furnished by membrane manufacturer.
- 03 Distribution Plates: Factory Mutual approved stress distribution plates formed from a minimum of 24 gauge G-90 C.Q. steel with a galvalume coating, or high strength polyblend. A 0.252 inch diameter hole is located in the center of the plate.
- 04 Water Cut-off Mastic: Compatible with materials with which it is used and furnished by membrane manufacturer.
- 05 Nite Seal: Compatible with materials with which it is used.
- 06 Pitch Pocket Sealant: Shall be a single component, self-leveling silicone sealant furnished by the manufacturer.
- 07 Fasteners: Compatible with roof deck as furnished by membrane manufacturer. Screws shall be furnished by membrane manufacturer and be Duro-Guard coated #14, and must pass 30 cycles in the Kesternich Cabinet DIN #50018-2 liter. The FM approved fastener is inserted through the hole in the plate and then properly secured to the deck. Use NTB fasteners at tectum decks.
- 08 Breather Vents: Two-way vents with factory attached skirt shall be installed at a density of one per 1000 square feet, and in accordance with manufacturer's specifications. Two-way vents shall be supplied by the manufacturer.
- 09 Termination/Edge Details: Shall be manufactured from rigid exterior vinyl with slotted holes for securement and furnished by the membrane manufacturer. All other terminations/edges must be approved by the membrane manufacturer.

D. Insulation:

- 01 Recovery board shall be installed and type to be approved by manufacturer in compliance with specified warranties.
- 02 Insulation shall be a minimum of 4 inches inch thick polyisocyanurate fastened as per manufacturer's current specifications.

E. Tapered Crickets (where required): Crickets shall be formed of tapered material having the same requirements and characteristics as listed in the preceding paragraph.

F. Roofing Nails: Nails shall be galvanized "Stronghold" type (for use on parapet walls, wood nailers).

2.2 MANUFACTURERS

- A. Versico, Versiweld (Basis of Design), 60-mil, mechanically attached, **Gray color**.
- B. Duro-Last Roofing, Inc.
- C. Firestone
- D. Carlisle
- E. Or equivalent

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2.3 ROOF METAL SYSTEM

- A. Gutter Roof Edge (Shop built):
 - 01 Aluminum Finish: As selected by Architect from clear anodized, bronze (light, medium or dark) anodized or Kynar 500 custom color.
 - 02 Gauge: .050"
 - 03 Clips: Galvanized
- B. Nails, Rivets and Fastenings:
 - 01 Nails shall be hot-dip galvanized for galvanized steel.
 - 02 Rivets shall be tinned soft iron rivets
 - 03 Aluminum - flat head, sizes as required.
- C. Sealant:
 - 01 Morrison and Co., or approved, CL-50 polyisobutylene; include primer as required.
- D. Butyl Sealer:
 - 01 Where impractical to use solder at joints, corners, etc., seal with "DAP Butyl Gutter and Lap Sealer, " or " Cushion-Lock CL-50 Butyl Sealer.
- E. Metal Wall Flashing:
 - 01 Springlok Flashing system type MA-Masonry, as manufactured by Fry Reglet Corp.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Precautions:
 - 01 Do not lay out or expose any insulation on the deck that cannot be covered by membrane on the same day.
 - 02 In making all field heat welds, make sure all edges are cleaned and free of tar, mastic or other foreign items.
 - 03 Do not expose membrane and accessories to a constant temperature in excess of 150 degrees F.
 - 04 Sealants and adhesives should be applied according to manufacturer's specifications and all containers shall be disposed of properly.
 - 05 Start securing the membrane at the highest point and work toward the drains.
- B. Protection of Roofing Surfaces: Storing, wheeling, or trucking directly on roof insulation or membrane surface is not recommended. Smooth, clean plywood or plank walkways, runways and platforms shall be provided as necessary.

3.3 MEMBRANE INSTALLATION

- A. Laying Out: Select the proper factory marked rolled sheets of roofing membrane for an outside corner or high point. Orient the roofing membrane so that the 3 inch wide fastening tabs are perpendicular to the ribs or corrugations of a steel deck or

- 1 perpendicular to the width of the prestressed concrete “T” slabs, etc. When laying
2 out each tab, pull the membrane tight.
- 3 B Roofing Sections: Unfold first sheet along edge of roof or parapet wall. Position and
4 fasten first tab with plates and screws according to membrane manufacturer
5 specifications. Unfold roofing sheet to the second 3 1/4 inch wide fastening tab. Pull
6 tab tight and secure to deck as herein after described, maintaining proper plate and
7 screw frequency, squarely placed. Continue unfolding and fastening roofing
8 membrane until entire sheet is in place. Install the adjacent roofing membrane
9 sheets using the fastening procedure described. Proceed until all sheets are in place,
10 thus forming a monolithic roof cover. Make sure all edges of each sheet of roofing
11 are fastened with the same fastener spacing as tabs, or are welded to another sheet
12 that is fastened in this manner.
- 13
- 14 C Field Welding: All field heat seams of the roofing materials shall be 1 1/2 inch
15 minimum, and made with a hot air welder. The hot air welder shall be in such a
16 position that the outside edge and both pieces of material will receive an equal
17 amount of heat and all of which will be closely followed by a 1 5/8 inch wide roller,
18 specially designed for this purpose. Make a hands and knees inspection of all field
19 welds with a probe.
- 20
- 21 D. Cut-Outs: Make cut-outs in roofing membrane for protrusions through the roof.
22 Some situations might require that the deck membrane be slit to the section edge
23 for fitting around protrusions. Fasten around cut-outs with approved fasteners, 12
24 inches on center or a minimum of one per side. The skirts on factory prefabricated
25 accessories when welded to deck membrane will cover these.
- 26
- 27 E. Stacks: After membrane has been attached, select proper size of premanufactured
28 round stack for roof vents and pipes. Drop stack over pipe, flat to roof, and heat weld
29 skirt to deck membrane. Using hand tool, tighten stainless steel band (or stainless
30 steel screw clamp) around top of stack to prevent water penetration, and cut off
31 excess. Using factory approved sealant, liberally seal the top of stack and steel band.
- 32
- 33 F. Custom Curb/Pitch Pockets: After securing cut-out as stated, heat weld bottom of
34 skirt to deck membrane. If the square or rectangular penetration has a removable
35 top (i.e., roof hatch, sky light, etc.) remove and fold custom curb over top, secure,
36 then lower onto frame. If top is not removable, secure top of custom curb with
37 termination bar and seal with factory approved sealant. Use this same procedure on
38 existing or new pitch pockets.
- 39
- 40 G. Breather Vents: For new construction or reroof, after tear-off, a 2 1/2 inch hole cut
41 down to the insulation facer is required. For recover application, a 2 1/2 inch hole cut
42 down to the original insulation facer is required. Refill hole with fiberglass insulation.
- 43
- 44 H. Parapet Walls: Fasten bottom tab of prefabricated parapet wall flashing 12 inches on
45 center with approved fasteners. This fastening sequence will secure both bottom of
46 parapet and edge of deck membrane. Base skirt should extend approximately 6
47 inches onto roof. This allows for a 1 1/2 inch weld and covering of fasteners and plates.
48 (Heat weld skirt to deck membrane.) On all termination bar applications, start
49 fastening at one end and proceed to the other. This will eliminate buckling of the
50 termination bar. Seal behind parapet wall material and on top of termination bar
51 with factory sealant. If parapet wall coping is to be covered, extend covering down
52 2 inches on exterior of coping and terminate accordingly.
- 53

- 1 I. Scuppers: Use of prefabricated custom roof scuppers is required. Terminate outside
2 of scupper lining with termination bar, as specified and field weld inside skirting to
3 membrane. Apply sealant to underside of lining and top of termination bar.
4
- 5 J. Gutter Edge: If gutter is attached to building 2 inches or more below roof line, extend
6 deck membrane over edge and terminate with termination bar and fasten 6 inches
7 on center. Apply sealant as specified. When the gutter is attached to the building,
8 level with roof line, notch the drip edge face around the gutter support brackets and
9 install according to specifications.
10
- 11 K. Roof Drains:
12 01 Secure cut-out made in deck membrane with four (4) equally spaced
13 fasteners and distribution plates. If drain is flush with deck, use a
14 prefabricated drain boot. Apply factory sealant all around drain,
15 approximately 12 inches under deck membrane, and down drain pipe. Heat
16 weld skirt to deck membrane and install the expanding snaprings.
17 02 If the roof drain has a secured clamping ring and strainer, unbolt and
18 remove. Clean and apply factory approved sealant under deck membrane
19 and around drain, for use as a water block seal after cutting properly sized
20 hold. Secure clamping ring and strainer to drain base over deck membrane.
21 Seal with factory approved sealant between clamping ring and roofing
22 membrane.
23
- 24 L. Expansion Joints/Valleys:
25 01 Whenever encompassing and elevated mid-roof expansion joint, you must
26 use a prefabricated expansion joint section. This section shall allow loose
27 layment over the joint and approved fastening on either side. A 6 inch skirt
28 on both sides will provide coverage of fasteners and still allow
29 approximately 1 1/2 inches for a field heat weld to deck membrane.
30 02 Valleys are worked in the same manner. Fasten according to specifications,
31 12 inches on center and lap deck membrane over fasteners. Heat weld deck
32 membrane to valley section.
33
- 34 M. Roof Tie-Ins:
35 01 When terminating the roofing membrane onto an existing roof, care must
36 be taken to stop any water from backing under the deck membrane.
37 02 For tie-ins on flat roofs (i.e., wood, concrete, gypsum, Tectum, etc.), cut a 2
38 inch slot to substrate or vapor barrier. Apply sealant and terminate using
39 termination bar secured 6 inches on center with approved fasteners. Fill
40 slots with urethane foam sealant, level with roof line. When the tie-in is
41 perpendicular to the flutes of a steel deck, they must be filled level.
42 Terminate according to above instructions.
43 03 On tie-ins into shingled pitched roof, secure on flat deck according to
44 specifications 12 inches on center and fold membrane over fasteners and up
45 to under shingles. Apply approved sealant for water stop under membrane,
46 and terminate 3 inches on center with fasteners at a vertical height of no less
47 than 12 inches.
48
- 49 N. Cleaning: Upon completion of the roof, leave the roof in a clean condition, and
50 properly remove and dispose of all debris.
51
- 52 O. Adjustments: After an authorized Quality Assurance Technician has inspected the
53 roof for determining acceptability for warranty issuance, any deficiencies on the final

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inspection report shall be corrected by the contractor/applicator and made ready for re-inspection within five (5) working days.

END OF SECTION

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SECTION 07 62 00

SHEET METAL FLASHING

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 for substitutions.
- B. Sheetmetal flashing, collector heads, downspouts, transitions and miscellaneous flashing.

1.2 RELATED WORK

- A. Section 07 54 23 – Thermoplastic Single Ply Membrane Roofing
- B. Section 07 61 13 – Prefinished Metal Roofing and Soffit

1.3 SUBMITTALS

- A. Product Data: submit manufacturer’s product data for all products proposed to be furnished.
- B. Shop drawings: submit detailed shop drawings of all flashing and fabrications proposed to be furnished.
- C. Mockups: submit mock-ups of all flashing and fabrications proposed to be furnished. Mock-ups, once accepted may be used in the final installation.
- D. Samples: submit a full range of actual metal samples of all paint colors available for selection by the Architect.

1.4 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers in satisfactory use in similar service for five years. Use experienced installers. Deliver, handle and store materials in accordance with manufacturer's instructions.
- B. Reference Standards: Applicable portions of SMACNA, ASTM and NAAMM publications.

1.5 WARRANTIES

- A. Manufacturer's Product Warranty: Submit manufacturer's standard limited product warranty signed by the manufacturer's authorized official, guaranteeing to correct failures in product which may occur during the warranty period, without reducing or otherwise limiting any other rights to correction which the Owner/Project Consultant may have under the contract documents. Failure is defined to include product failure which leads to interruption of a watertight installation. Correction may include repair or replacement of failed product.

- 1 B. Contractor's Warranty period: For roofing flashing and sheet metal, provide a written
- 2 warranty which shall warrant work to be free of leaks and defects in materials and
- 3 workmanship for two (2) years, starting from date of substantial completion.
- 4
- 5 C. Defects of the sheet metal occurring during the warranty period shall be promptly
- 6 corrected by the contractor, and defects of the roofing shall be promptly corrected by
- 7 the manufacturer at no additional cost to the Owner. Upon notification from the Owner
- 8 or the Owner's representative that evidence of a defect exists, the responsible party shall
- 9 immediately inform the Owner's representative of the date on which corrective work will
- 10 be scheduled, and shall notify the Owner's representative when the corrective work has
- 11 been completed.
- 12

13 **PART 2 – PRODUCT**

14

15 **2.1 SHEET METAL MATERIAL**

- 16 A. Flashing Stock Material: zinc-coated (galvanized) steel; commercial quality with 0.20
- 17 percent copper, G90 hot-dip galvanized ASTM A526, except ASTM A527 for lock-forming
- 18 material.
- 19
- 20 01 Fascia, cap flashing, roof edge, parapet, coping and miscellaneous
- 21 flashing shall be minimum 24 gage. Associated flashing clips / cleats shall
- 22 be minimum 22 gage.
- 23 02 Collector heads, downspouts and boots shall be minimum 24 gage.
- 24 03 Thru-wall metal flashing components shall be minimum 24 gage.
- 25
- 26 B. Finish: Finish for all exposed sheetmetal work shall be a premium factory applied / baked
- 27 on PVDF paint finish using a Kynar 500 resin base, containing a minimum of 70%
- 28 fluoropolymer, meeting AAMA 2605-98 standards.
- 29 01 BASF “Fluoroceram”
- 30 02 PPG Industries “Duramar”
- 31 03 The Velspar Corporation “Fluopon”
- 32 04 Color on finish side shall be as selected by the Architect from the
- 33 manufacturer’s standard colors. Color on
- 34 concealed side shall be manufacturer’s option.
- 35 05 Provide a strippable, protective coating material on all finished
- 36 portions of pre-finished flashing; to be removed following installation.
- 37
- 38 C. Finished Sheetmetal Locations: Provide pre-finished sheetmetal at all flashing locations
- 39 exposed to normal view(s), including continuation of component to non-exposed
- 40 locations. Typical locations include, but are not limited to:
- 41 01 Roof Edge stated above/ Parapet / Cap Flashing
- 42 02 Gutters, Scuppers, Collector Heads and Downspouts
- 43 03 Plaster Counter/Flashing
- 44 04 Fascias and associated Trim
- 45 05 Drip Edges
- 46 06 Fasteners for all pre-finished sheetmetal shall match the finish of the
- 47 associated component.
- 48
- 49 D. Unfinished Sheetmetal Locations: Provide unfinished, galvanized sheetmetal as
- 50 described above at all flashing locations concealed from normal view(s). Typical
- 51 locations include, but are not limited to:
- 52 01 Thru-Wall Flashing
- 53 02 Pitch Pans
- 54 03 Roof Curbs / Hoods and associated flashing (Where not exposed to view).
- 55

1 **2.2 FASTENERS**

- 2
- 3 A. Nails, Rivets and Fastenings:
- 4 01 Nails shall be annular hot-dip galvanized for galvanized steel.
- 5 02 Rivets shall be Full stainless steel Series 42 or 44, as appropriate. Do not
- 6 use pop rivets where exposed to view.
- 7 03 Aluminum - flat head, sizes as required.
- 8
- 9 B. Fasteners shall be same metal as flashing/sheet metal, or other non-corrosive metal as
- 10 recommended by sheet manufacturer for the specific application. Match finish of exposed
- 11 heads with material being fastened.
- 12
- 13 C. Fasteners and fastening plates or bars shall be listed in the Factory Mutual Approval Guide.
- 14
- 15 D. Fastener for Plaster: Shall be one-fourth inch by two inches (1/4" x 2"), zinc with plated
- 16 steel or stainless steel nail, one piece unit, flat head.
- 17
- 18 E. Screws: Self-tapping sheet metal type with neoprene washer, as appropriate.
- 19
- 20 F. Continuous Clip: Concealed hold-down clip type; of same materials as coping, gravel guard,
- 21 sized to suit application. Use a continuous clip, minimum 22-gauge G-90 galvanized.
- 22
- 23 G. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar
- 24 accessory units as required for installation of work, matching or compatible with material
- 25 being installed, non-corrosive, size, and gauge required for performance.
- 26

27 **2.3 RELATED MATERIAL**

- 28
- 29 A. Solder: QQ-S-571 composition best suited for purpose; use high tin content, minimum
- 30 60/40, for stainless steel and Monel alloy.
- 31
- 32 B. Sheet Lead: QQ-L-201, Grade B.
- 33
- 34 C. Sealant (for Sheet Metal): One-component polyurethane, conforming to requirements of
- 35 FS TT-S-230C, non-staining and non-bleeding.
- 36
- 37 D. Butyl Sealer:
- 38 01 Where impractical to use solder at joints, corners, etc., seal with
- 39 "DAP Butyl Gutter and Lap Sealer", or "Cushion-Lock CL-50 Butyl Sealer.
- 40
- 41

42 **2.4 FABRICATION - GENERAL**

- 43
- 44 A. Shop-fabricate work to greatest extent possible. Comply with details shown, and with
- 45 applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other
- 46 recognized industry practices. Fabricate for waterproof and weather-resistant
- 47 performance; with expansion provisions for running work, sufficient to permanently
- 48 prevent leakage, damage or deterioration of the work. Form work to fit substrates.
- 49 Comply with material manufacturer's instructions and recommendations. Form exposed
- 50 sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and
- 51 levels as indicated, with exposed edges folded back to form hems.
- 52
- 53 B. Fabricate gravel stops/fascia, gutters/downspouts, counter-flashings, pitch pans, expansion
- 54 joints, and copings with new-galvanized sheet metal as specified. Fabricate gravel guard
- 55 and fascia to size and dimensions as indicated on the drawings. Fabricate light metal
- 56 coping, gutters and downspouts as indicated.
- 57

- 1 C. Form sheet metal on bending brake. Form materials with straight lines, sharp angles and
- 2 smooth curves.
- 3
- 4 D. Shape, trim and hand seam metal on bench insofar as practicable.
- 5
- 6 E. Fold back edges on concealed side of exposed edge to form hem (1/2" minimum).
- 7
- 8 F. Weld or solder joints on parts that are to be permanently and rigidly assembled.
- 9
- 10 G. Limit single-piece lengths to ten feet (10').
- 11
- 12 H. Fabricate corner pieces with eighteen-inch (18") extensions, metered and sealed by forming
- 13 as one piece.
- 14
- 15 I. All sheet metal shall be sealed and watertight.
- 16
- 17 J. Metal work should be secured so as to prevent damage from buckling or wind. Where clips
- 18 are shown, these are to be continuous.
- 19
- 20 K. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. For metal other
- 21 than aluminum, tin edges are to be seamed, form seams, and solder.
- 22
- 23 L. Expansion Provisions: Form expansion joints of intermeshing hooked flanges, not less than
- 24 one inch (1") deep, filled with mastic sealant (concealed within joints).
- 25
- 26 M. Sealant Joints: Where movable, non-expansion type joints are indicated or required for
- 27 proper performance of work, form metal to provide for proper installation of elastomeric
- 28 sealant, in compliance with industry standards.
- 29
- 30 N. Separations: Provide for separation of metal from non-compatible metal or corrosive
- 31 substrates by coating concealed surfaces at locations of contact, with bituminous coating
- 32 or other permanent separation as recommended by manufacturer/fabricator.
- 33
- 34 O. Bed flanges of work in a thick coat of roofing cement in accordance with roofing system
- 35 manufacturer's requirements where required for waterproof performance.
- 36

37 PART 3 - EXECUTION

38 3.1 INSPECTION

- 39 A. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant
- 40 strips and reglets in place, substrates are smooth and clean and nailing strips located.
- 41
- 42 B. Verify membrane termination and base flashings are in place, sealed and secure.
- 43
- 44 C. Beginning of installation means acceptance of conditions.
- 45

46 3.2 PREPARATION

- 47 A. Field measure site conditions prior to fabricating work. Provide all shop drawings and
- 48 mock-ups one month prior to installation to the Owner/Project Consultant for approval.
- 49
- 50 B. Install starter and edge strips and cleats before starting installation.
- 51
- 52
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1 **3-3 INSTALLATION**

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3 A. General: All sheet metal termination to vertical wall shall have a through-wall with receiver
4 installed on masonry walls or prefabricated "Z" bar flashing pre-installed to fluid applied
5 wall finished prior to installation of sheet metal termination. This applies to edge metal,
6 base flashing closures and all vertical surface intersections. Refer to NRCA, SMACNA, and
7 metal manufacturer's guidelines.
8

9 B. Cap Flashing / Fascia:

- 10 01 Shall be installed with expansion joints, ten feet (10') on center,
11 one-fourth inch (1/4") expansion leeway, with a cover plate.
12 02 Secure metal flashings with continuous cleats on exposed face(s).
13 03 Lock seams and end joints.
14 04 Form sections identical to profiles as shown or approved similar, to match
15 existing building.
16 05 Fabricate corner pieces with minimum eighteen inch (18"), maximum
17 forty-eight inch (48") extensions, formed and sealed with rivets and
18 sealant, as one piece.
19 06 Hem exposed edges three-fourths inch (3/4") minimum.
20 07 Integrate flashing in a manner consistent with detailing.
21 08 Provide and install continuous clip around perimeter.
22 09 Shall be fabricated in accordance with all SMACNA provisions.
23

24 C. Counterflashing:

- 25 01 Install metal counterflashing at all interfacing work as required for a
26 permanent watertight installation.
27

28 D. Collector Head and Downspout:

- 29 01 Fabrication:
30 a. Fabricate collector head and downspout in size and profile as
31 indicted in the drawings, taking care that the scupper boot and
32 roof system interface properly into the back of the collector
33 head. Seal the pipe to the collector head for water-tightness.
34 b. Field measure site conditions prior to fabricating work.
35 c. Fabricate with required connection pieces.
36 d. Fabricate section square, true, and accurate in size, in maximum
37 possible lengths and free of distortion or defects detrimental to
38 appearance or performance.
39 e. Hem exposed edges of metal.
40 f. Form and seal all metal joints; provide for expansion joints per
41 SMACNA.
42 02 Installation:
43 a. Install collector head, downspout, and accessories.
44 b. Join lengths with seams pop riveted and sealed watertight. Flash
45 and seal collector head to downspouts and accessories.
46 c. Seal all metal joints watertight for full metal surface contact.
47 d. Support Brackets, Joint Fasteners: Profiled to suit gutters and
48 downspouts.
49 e. Anchorage Devices: SMACNA requirements. Type
50 recommended by fabricator.
51 f. Downspout Supports: minimum 1" x 22 gage Galvalume straps,
52 minimum 3 per downspout.
53 g. coordinate routing of downspouts with rainwater harvesting
54 systems, when applicable.
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E. Pitch Pans:

- 01 Install pitch pans of 24-gauge G-90 galvanized sheetmetal according to NRCA standards, minimum of six inches by six inches (6" x 6").
- 02 Pitch pans shall be fabricated to minimum of eight inches (8") above the finished roof membrane.
- 03 Mastic shall be applied under pitch pan flange a minimum of one-half pound (1/2#) per linear foot.
- 04 All metal flanges shall be primed with asphalt primer prior to flashing installation. Inside of pitch pan shall be cleaned and primed as required by pitch pan sealant manufacturer.
- 05 All projections enclosed in pitch pans shall be cleaned in any manner suitable and coated with a rust inhibitive coating as approved by the Project Consultant. Coating shall be allowed to dry prior to pitch pan fill.
- 06 Base of pitch pans shall be filled with grout or cementitious binder to proper height and allowed to cure.
- 07 Top finish fill shall be self-leveling, one-part urethane, with maximum fill to within three-eighths inch (3/8") of top of pitch pan sides.
- 08 Strip metal flange of pitch pan with one strip of Type IV fiberglass felt set in hot bitumen extending from the outer edge of the flange a minimum of three inches (3") inward to base of pitch pan.
- 09 Strip in fiberglass felt with .060-inch coal-tar elastomeric membrane (CTEM) flashing set in hot asphalt extending from the outer edge of the Type IV fiberglass underlayment a minimum of three inches (3") inward to the base of the pitch pan.

F. Bonnets/Hoods:

- 01 Fabricate and install above all pitch pans, where necessary, or reinstall as applicable, metal bonnets over all pitch pans, NO EXCEPTIONS.
- 02 Bonnets/Hoods shall be manufactured with metal compatible with metal to which bonnet is to be attached.
- 03 On beams and other steel, weld in place bonnets fabricated from one-fourth inch (1/4") steel plate.
- 04 Draw band bonnets fabricated from 22-gauge galvanized steel may be used on circular projections.

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SECTION 07 84 13

FIRESTOPPING, PENETRATION SEALS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included

- 01 Furnish all materials and labor required for installation of firestops around through - penetrations of pipe, duct, cable, cable tray, conduit, other electrical devices, blank openings and at the periphery of fire-rated walls, floors, partitions and floor/ceiling assemblies.

B. Related Work

- 01 Section 03 30 00 - Concrete
- 02 Section 04 20 00 - Masonry
- 03 Section 07 90 00 - Joint Sealant
- 04 Section 09 28 16 - Gypsum Drywall Systems
- 05 Division 22 and 28 Sections - Mechanical, Electrical, and Plumbing Work

1.2 QUALITY ASSURANCE:

A. Standards

- 01 ASTM E-814, Standard Method for Fire Tests of Through - Penetration Fire Stops.
- 02 ASTM E-84, Standard Test Method for Surface Burning Characteristics of Building Materials.
- 03 UL 1479, Fire Tests of Through-Penetrations Firestops.
- 04 UL 723, Standard for Test for Surface Burning Characteristics of Building Materials.
- 05 UL Fire Resistance Directory; Through - Penetration Firestop Systems (XHEZ), and Fill, Void or Cavity Materials (XHHW).
- 06 NFPA 101 - Life Safety Code
- 07 NFPA 70 - National Electric Code

B. Performance

- 01 Firestop systems shall provide a fire resistance rating at least equal to the hourly resistance rating of the fire-rated barrier.
- 02 Firestop Systems shall have been tested in accordance with ASTM E-814 or UL 1479 under a minimum positive pressure of 0.01 in. of water.

1.3 DEFINITIONS

A. Penetration: Any opening of foreign material passing through or into a fire-rated barrier.

B. Fire-Rated: Have the ability to withstand the effects of a standard fire exposure for a specified time period, as determined by qualified testing.

- 1 C. Fire-Rated Barrier: A floor, wall, partition or floor-ceiling assembly able to
- 2 withstand a standard fire and hose stream test without failure.
- 3
- 4 D. Fire Resistance Rating: The ability of a structure to act as a barrier to the spread
- 5 of fire and to confine it to the area of origin. Ratings are expressed in hours and
- 6 apply to beams, columns, floors, roofs, walls and partitions.
- 7
- 8 E. Firestopping: A means of sealing openings in fire-rated barriers to preserve or
- 9 restore the fire resistance rating.
- 10
- 11 F. Firestop System: a material, or combination of materials, installed to retain the
- 12 Integrity of fire-rated construction by maintaining an effective barrier against the
- 13 spread of flame, smoke or gases through penetrations in fire-rated vertical
- 14 barriers It should be used in specific locations as follows:
- 15 01 Penetrations for the passage of duct, cable, cable tray, conduit, piping
- 16 and electrical busways and raceways through fire-rated vertical barriers
- 17 (walls and partitions), horizontal barriers (floor slabs and floor/ceiling
- 18 assemblies), and vertical service shafts.
- 19 02 Openings between floor slabs and curtain walls.
- 20 03 Openings between structurally separate sections of walls of floors.
- 21 04 Gaps between the top of walls and ceiling or roof assemblies.
- 22 05 Vertical service shafts at each floor level.
- 23 06 Expansion joints in walls and floors.
- 24 07 Openings and penetrations in fire-rated partitions or walls containing fire
- 25 doors.
- 26

27 **1.4 SUBMITTALS**

- 28
- 29 A. Comply with Section 01 33 00.
- 30
- 31 B. Product Data
- 32 01 Submit copies of manufacturer’s specifications, recommendations,
- 33 installation instructions, and maintenance data for each type of material
- 34 required.
- 35 02 Submit a copy of UL illustration of each proposed system indicating
- 36 manufacturer-approved modifications.
- 37

38 **1.5 DELIVERY, STORAGE AND HANDLING**

- 39
- 40 A. Deliver materials undamaged in manufacturer’s clearly labeled, unopened
- 41 containers, identified with brand, type, grade, and UL label where applicable.
- 42
- 43 B. Coordinate delivery with scheduled installation date to allow minimum storage
- 44 time at site
- 45
- 46 C. Store materials in clean, dry, ventilated location. Protect from soiling, abuse, and
- 47 moisture. Follow manufacturer’s instructions.
- 48

49 **1.6 PROJECT CONDITIONS**

- 50
- 51 A. Existing Conditions
- 52 01 Verify existing conditions and substrates before starting work. Correct
- 53 unsatisfactory conditions before proceeding.

- 1 02 Proceed with installation only after penetrations of the substrate and
- 2 supporting brackets have been installed.
- 3
- 4 B. Environmental Requirements
- 5 01 Furnish adequate ventilation if using solvent.
- 6 02 Furnish forced air ventilation during installation if required by
- 7 manufacturer.
- 8 03 Keep flammable materials away from sparks or flame.
- 9 04 Provide masking and drop cloths to prevent contamination of adjacent
- 10 surfaces by fire stopping materials.
- 11

12 **PART 2 - PRODUCTS**

13

14 **2.1 MANUFACTURERS**

- 15
- 16 A. Hilti Construction Chemicals, Inc.
- 17 B. 3M Corporations
- 18 C. Tremco
- 19 D. Metalines, Inc.
- 20

21 **2.2 MATERIALS**

- 22
- 23 A. Firestopping materials / constructions shall constitute one or more of the
- 24 following products or equal by other listed manufacturers.
- 25 01 Hilti CP601S Firestop Sealant: An adhesive, one-part, silicone-based,
- 26 elastomeric sealant.
- 27 02 Hilti FS ONE Intumescent Wrap: An Aluminum foil-backed intumescent
- 28 strip for plastic or insulate pipe.
- 29 03 Damping Materials: Hilti CF 128 Adhesive Filling and Sealing Foam or fire-
- 30 tested designs.
- 31
- 32 B. Firestopping materials shall be asbestos-free, emit no toxic or combustible fumes
- 33 and be capable of maintaining an effective barrier against flame, smoke, gas, and
- 34 water in compliance with previously referenced standards.
- 35
- 36 C. Firestopping materials /systems shall be flexible to allow for normal movement of
- 37 building structure and penetrating item(s) without affecting the adhesion or
- 38 integrity of the system.
- 39

40 **PART 3 - EXECUTION**

41

42 **3.1 PREPARATION**

- 43
- 44 A. Prepare substrate surfaces to ensure proper and adequate structural support for
- 45 the specified UL Rated Firestop System. Install fire-rated partitions /floors with
- 46 void to receive firestop system.
- 47
- 48 B. Clean surfaces from all foreign materials i.e. , loose debris, dirt, oil, grease, wax
- 49 and/or oil caulking before sealant is applied.
- 50
- 51 C. Field measure and verify dimensions as required.
- 52

- 1 D. Protect adjacent areas or surfaces from damage as a result of the work of this
2 Section.

3
4 **3.2 APPLICATION**

- 5
6 A. Installation of fire stopping materials shall be in exact accordance with the
7 manufacturer's latest published instructions.
8
9 B. Installation shall be in accordance with the appropriate UL Building Materials
10 Directory Assembly or with the appropriate Warnock Hersey International Listing.
11
12 C. Seal holes or voids made by penetrating items to ensure an effective fire and
13 smoke barrier.
14
15 D. Seal all intersections and all penetrations of floors, ceilings, walls, and columns.
16
17 E. Seal around all cutouts for lights, cabinets pipes, and plumbing, HVAC ducts,
18 electrical boxes, etc.

19
20 **3.3 FIELD QUALITY CONTROL**

- 21
22 A. Examine finished penetrations to ensure proper installation before concealing or
23 enclosing any areas of work.
24
25 B. Keep areas of work accessible until inspection by applicable code authorities, and
26 Architect.
27
28 C. Manufacturer's Field Service: Inspect to verify and confirm that systems
29 installation is in strict conformance with manufacturer's and UL requirements.
30 Report to Architect.
31
32 D. Correct unacceptable work and provide further inspection to verify compliance
33 with requirements.

34
35 **3.4 CLEANING**

- 36
37 A. Immediately remove all spots, smears, stains, residues, adhesives, etc., from the
38 work of this Section and or upon adjacent areas or surfaces which result from the
39 work of this Section.
40
41 B. Upon the completion of the work of this Section, dispose of (away from site) all
42 debris, trash containers, residue, remnants and scraps which result from the work
43 of this Section.
44
45 C. Cleaning to be free of volatile solvents. Leave work area in a clean and
46 satisfactory condition.
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51 **END OF SECTION**

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SECTION 07 90 00

BUILDING SEALANTS

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SUBMITTALS

- A. Comply with Section 00 21 16 for substitutions.
- B. Product Data:
 - 01 Manufacturer's specifications and other data needed to prove compliance with specified requirements.
 - 02 Manufacturer's installation instructions
- C. On site sample for Architect's approval of colors.

1.3 INSTALLATION CONFERENCE:

- A. Refer to Section 01420 - Notification of Architect Requirements

1.4 REFERENCES

- A. Federal Specifications TT-S-00227E
- B. ASTM C793, ASTM C794

1.5 WARRANTIES

- A. Warrant the work specified herein for two years against becoming unserviceable or causing an objectionable appearance, resulting from either defective or nonconforming materials and workmanship. Warrant exterior joints against failure of the joint to effectively seal out water or moisture. Warrant interior joints against cracking, crazing separation of the material from the substrate or other joint failure.

1.6 SCOPE OF WORK

- A. This Section includes exterior sealants and sealants for moving joints and interior caulking.
- B. Coordinate concrete specifications for paving sealants.
- C. Coordinate glass and glazing section for glass sealants.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Caulking for exposed non-working interior locations at all door frames and abutting surfaces at ceiling, wall angles and all other locations for finished appearance:
Type: Tremco "Acrylic Latex 834"
- B. Exterior concrete joints, including drives, parking, sidewalks, play surfaces and other flatwork:
Type: Tremco "THC 900/901"
- C. Exterior highly active joints in walls, masonry or concrete fences:
Type: Tremco "Dymeric"

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- D. Exterior joints around windows, glazing, entrances, soffit joints and other general sealant areas: Tremco “Mono”
- E. Interior Expansion Contraction or Control Joints where movement is to be accommodated: Tremco “Mono”
- F. Primers, Cleaners, Top Coats: Use only materials listed as suitable in resistance to staining, compatibility and durability before proceeding.
- G. Back-Up Filler: Closed cell or open cell, non-gassing filler as recommended by sealant manufacturer.

2.2 MANUFACTURERS

- A. Tremco (Basis of Design)
- B. Dow Chemical Co.
- C. Sonneborn

PART 3 - EXECUTION

3.1 APPLICATION

- A. Temperatures: Do not install sealants when air temperature is under 40°Fahrenheit. Sealants may be warmed to ease installation when recommended by the manufacturer.
- B. Tooling: Tool exposed joints to a slightly concave surface using slicking materials recommended by the manufacturer. The tooling procedure shall press sealant against the sides of the groove. No materials shall be left "feathered" out or smeared on the abutting materials. If necessary, protect adjacent surfaces with tape. Completed joints shall have a uniform professional appearance. Use an anti-tack compound on sealant that does not set up fast enough to avoid dust collection.
- C. Sealant Back-Up: Provide a back-up filler where groove depth is too great to fill with sealant. Review joint design with Architect.
- D. Compressive Filler: Seal vertical expansion joints with fillers. Provide compressible filler twice the width of the joint and with a depth of one and one-half times the compressed width. Lap ends a minimum of 2 inches
- E. Seal ends together in such a manner to allow natural drainage. Install filler by compressing material and sliding into joint. Align filler on one face of the joint before it expands to the full joint width.

END OF SECTION

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SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 SUBSTITUTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SCOPE

- A. Hollow metal doors
- B. Hollow metal door and glazing frames
- C. Related Work
 - 01 Section 08213 - Plastic Laminate Faced Wood Doors
 - 02 Section 08215 - Interior Aluminum Frames
 - 03 Section 08710 - Finish Hardware
 - 04 Section 08800 – Glass and Glazing

1.3 SUBMITTALS

- A. Comply with Section 01300.
- B. Product Data: Manufacturer's specifications and technical data for all products proposed to be furnished.
- C. Shop Drawing: Show or schedule each door's location, size, thickness, details of construction, fire rating where applicable.
 - 01 Provide installation details indicating specific assemblies related to the work of this project. Generic details are not acceptable.
- D. Finish Hardware Location: Hollow metal manufacturer shall obtain an approved hardware schedule, hardware templates and samples of physical hardware where necessary to ensure correct fitting and installation.

1.4 QUALITY ASSURANCE

- A. References
 - 01 National Fire Protection Association - NFPA Pamphlet No. 80
 - 02 American Society for Testing Materials:
 - a. ASTM A526 - Steel sheet, zinc-coated (galvanized) by hot dip process, commercial quality
 - b. ASTM A366 - Steel, carbon, cold-rolled sheet, commercial quality
 - 03 Underwriters Laboratories, Inc., in reference to fire-rated metal doors and frames.
 - 04 Factory Mutual, in reference to doors and frames.
 - 05 American National Standards Institute:
 - a. ANSI A151-1-1969, Test Method for Standard Steel Doors
 - b. ANSI A250.11-2001 Recommended Erection Instructions for Steel Frames
 - 06 NAAMM Hollow Metal Manufacturers Association

- 1
- 2 B. Delivery, Storage and Handling
- 3 01 Deliver, store and handle hollow metal work in strict accordance with
- 4 manufacture's recommendations to prevent damage, rust and
- 5 deterioration. Store materials in a covered, dry location and promptly
- 6 clean and touch-up scratches or rust spots with a rust-inhibitive primer.
- 7 02 Doors shall have their wrappings or coverings removed upon delivery at
- 8 the building site and shall be stored in a vertical position spaced by locking
- 9 for air circulation.

10 **PART 2 - PRODUCTS**

11 **2.1 MATERIALS**

- 12
- 13 **2.1 MATERIALS**
- 14
- 15 A. Doors
- 16 01 Doors shall be custom made, of types and sizes shown on reviewed shop
- 17 drawings, and shall be fully welded seamless construction with no visible
- 18 seams or joints on faces or vertical edges. Minimum door thickness shall
- 19 be 1 3/4 inches, unless specifically noted or shown differently.
- 20 02 Doors shall be strong, rigid and neat in appearance, free from warp and
- 21 buckle. Corner bends shall be true and straight and of minimum radius for
- 22 gage of metal used. Provide 22 gage steel stiffeners spaced max. 6 inch
- 23 o.c. and extending full height of door. Fill interior with foamed in place
- 24 urethane. Use mineral filler as required for labeled doors.
- 25 03 Door Face Gages:
- 26 a. Doors 36" wide or less shall be 16 gage galvanized.
- 27 b. Doors 37" wide or more shall be 14 gage galvanized.
- 28 04 Faces shall be joined at vertical edges of door by a continuous weld
- 29 extending full height of door. Welds shall be ground, filled and dressed
- 30 smooth to provide a smooth flush surface.
- 31 05 Top and bottom edges of doors shall be closed with a continuous recessed
- 32 steel channel not less than 16 gage, extending full width of door and spot
- 33 welded to both faces. Exterior doors shall have an additional flush closing
- 34 channel at top and bottom edges. Openings shall be provided in the
- 35 bottom closure channel at top and bottom edges. Openings shall be
- 36 provided in the bottom closure of exterior doors to permit the escape of
- 37 entrapped moisture.
- 38 06 Edge profile shall be provided on both vertical edges of door as follows:
- 39 a. Single-acting swing doors - beveled 1/8 inch in 2 inch
- 40 07 Hardware Reinforcements:
- 41 a. Doors shall be mortised, reinforced, drilled and tapped at factory
- 42 for fully templated hardware, in accord with the reviewed
- 43 hardware schedule and template provided by Section 08710 -
- 44 Finish Hardware. Where surface-mounted hardware is to be
- 45 applied, doors shall have reinforcing plates only.
- 46 b. Minimum gages for hardware reinforcing plates shall be as
- 47 follows:
- 48 1. Hinge & pivot reinforcements: 7 gage
- 49 2. Reinforcements for lock face, flush bolts, concealed
- 50 holders, concealed or surface-mounted closers: 12 gage
- 51 3. Reinforcements for lock face, flush bolts, concealed
- 52 holders, concealed or surface-mounted closers: 12 gage
- 53 08 Glass moldings and stops - Loose stops shall be not less than 18 gage steel,
- 54 with butt corner joints, secured to frame opening by countersunk tamper
- 55 proof screws. Snap-on attachments will not be acceptable.
- 56 09 Edge Clearances:
- 57 a. Between door and frame at head and jambs: 1/8 inch
- 58 b. At doorsills with no threshold, 5/8 to 3/4 inch above finished floor
- 59 c. At door sills with threshold, as required to suit threshold
- 60 d. Between meeting edges of double doors - 1/8 inch
- 61 10 Steel Louvers: Fabricate from 16 gage and galvanized (zinc coated),
- 62 inverted "V" blade, sight proof type, unless otherwise shown.
- 63 11 Exterior Doors and Frames shall be Hot Dipped Galvanized.
- 64

- 1 B. Frames
- 2 01 Frames for exterior openings shall be made of commercial cold rolled steel
- 3 conforming to ASTM A366, and shall be galvanized after fabrication.
- 4 02 Frames for interior openings shall be either commercial grade, cold-rolled
- 5 steel conforming to ASTM A366 or commercial grade hot rolled and
- 6 pickled steel conforming to ASTM A569.
- 7 03 Door Frame Gages:
- 8 a. Exterior door frames 48" wide or less shall be 14 gage
- 9 b. Exterior door frames 49" wide or more shall be 12 gage.
- 10 c. Interior door frames 48" wide or less shall be 16 gage.
- 11 d. Interior door frames 49" wide or more shall be 14 gage.
- 12 04 Frames shall be custom made, welded units with integral trim of sizes and
- 13 shapes shown on Drawings and required for the specific intended use.
- 14 05 Frames shall be strong and rigid, neat in appearance, square, true and free
- 15 of defects, warp and buckle. Molded members shall be clean cut, straight
- 16 and of uniform profile throughout their length.
- 17 06 Jamb depths, trim, profile and backbends shall be as shown on Drawings
- 18 and required for the specific intended use. 07 Corner joints
- 19 shall have contact edges closed tight, with trim faces mitered and
- 20 continuously welded, and stops butted. The use of gussets shall not be
- 21 permitted.
- 22 08 Minimum depth of stops shall be 5/8 inch.
- 23 09 Frames for multiple openings shall have mullion and rail members which
- 24 are closed tubular shapes having no visible seams or joints. Joints between
- 25 faces of abutting members shall be securely welded and finished smooth.
- 26 10 Hardware Reinforcements: Frames shall be mortised, reinforced, drilled
- 27 and tapped at factory for fully templated hardware in accordance with
- 28 finish hardware schedule and templates provided by Section 08710 - Finish
- 29 Hardware. Where surface-mounted hardware is to be applied, frames shall
- 30 have reinforcing plates only.
- 31 11 Minimum thickness of hardware reinforcing plates shall be as follows:
- 32 a. Hinge and pivot reinforcements (1-1/4" x 10" minimum size): 7
- 33 gage
- 34 b. Strike reinforcements: 12 gage
- 35 c. Flush bolt reinforcements: 12 gage
- 36 d. Closer reinforcements: 12 gage
- 37 e. Reinforcements for surface-mounted hardware, hold-open arms,
- 38 surface panic devices: 12 gage
- 39 12 Floor anchors shall be securely welded inside each jamb, with holes for
- 40 floor anchorage.
- 41 13 Jamb Anchors for frames for installation in masonry walls shall be provided
- 42 with adjustable jamb anchors of the T-Strap type. Anchors shall be not less
- 43 than 16 gage steel. The number of anchors provided at each jamb shall be
- 44 as follows:
- 45 a. Frames up to 7'-6" height - 3 anchors
- 46 b. Frames 7'-6" to 8'-0" height - 4 anchors
- 47 c. Frames over 8'-0" height - 1 anchor for each 2 feet, or fraction
- 48 thereof in height.
- 49 14 Jamb Anchors for frames for installation in wood or metal stud partitions
- 50 shall be provided with steel anchors of suitable approved design, not less
- 51 than 16 gage thickness, securely welded inside each jamb as follows:
- 52 a. Frames up to 7'-6" height - 4 anchors
- 53 b. Frames 7'-6" to 8'-0" height - 5 anchors
- 54 c. Frames over 8'-0" height - Four anchors plus one additional for
- 55 each 2 feet, or fraction thereof over 8 inches.
- 56 15 Jamb Anchors for frames to be anchored to previously placed concrete,
- 57 masonry or structural steel shall be provided with anchors of suitable
- 58 design as shown on reviewed shop drawings.
- 59 16 Dust cover boxes of not less than 26 gage steel shall be provided at all
- 60 mortised hardware items.
- 61 17 Frames shall be provided with steel spreader temporarily attached to
- 62 bottoms of both jambs for bracing during shipping and handling.
- 63 18 Loose glazing stops shall be of cold rolled steel, not less than 18 gage
- 64 thickness, butted at corner joints and secured to the frame with

- 1 countersunk cadmium or zinc-plated screws. Loose stops at exterior
 2 frames shall be placed on the exterior side of the frames unless otherwise
 3 shown.
 4 19 Prepare frame for silencers. Provide three single silencers for single doors
 5 on strike side. Provide two single silencers on frame head at double doors
 6 without mullions.
 7
 8
 9 C. Finish: Shop paint steel (whether galvanized or ungalvanized) stops and
 10 accessories as follows:
 11 01 Clean surfaces free of mill scale, rust, oil, grease, dirt and other foreign
 12 matter.
 13 02 Chemically treat surfaces and apply one coat of an approved baked-on
 14 rust-inhibitive primer paint to provide a minimum 0.5-mil dry film
 15 thickness.
 16
 17 D. Labeled Doors and Frames
 18 01 Labeled doors and frames shall be provided for openings requiring fire
 19 protection ratings as scheduled. Such doors and frames shall be
 20 constructed as tested and approved by Underwriters Laboratories or
 21 other nationally recognized testing agency having a factory inspection
 22 service.
 23 02 If any door or frame scheduled to be fire rated cannot qualify for
 24 appropriate labeling because of its size, design, hardware or other reason;
 25 the Architect shall be so advised before fabrication work on that item is
 26 started.
 27
 28 E. Jamb Extensions
 29 01 At hollow metal doorframes 48" wide and wider, and interior windows 72"
 30 and wider, coordinate as required for installation of steel channel supports
 31 at jambs.
 32 02 Provide structural extensions at jambs as shown or required.
 33 03 Extensions are required for vertical members not otherwise adequately
 34 braced at top.
 35 04 Extension shall be C3 x 4.1 channel extending 12 inches into frame and
 36 welded. Weld to structure or provide 2" x 2" x 1/4" steel angle headers
 37 installed in structure above to form rigid assembly.
 38

39 **2.2 MANUFACTURERS**

- 40
 41 A. Hollow metal door and frame manufacturers shall be members of the National
 42 Association of Architectural Metal Manufacturers (NAAMM)
 43
 44 B. The following manufacturers are prequalified to provide hollow metal doors and
 45 frames subject to provisions and requirements of this section of specifications:
 46 01 Curries
 47 02 Ceco / United Dominion Industries
 48 03 Republic Doors and Frames
 49 04 Pearland Industries
 50 05 Steelcraft
 51 06 American Door Products
 52 07 Door Pro Systems
 53

54 **PART 3 - EXECUTION**

55 **3.1 INSTALLATION**

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 58 A. Separate dissimilar metals, protect against galvanic action.
 59
 60 B. Frames

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- 01 Anchorage and Connections. Firmly anchored and secure to adjacent construction.
 - 02 Frame Spreader Bars: Leave intact until frames are set perfectly square and plumb and anchors are securely attached.
 - 03 Remove hardware, with the exception of prime-coated items, tag box, and reinstall after finish paint work is completed.
 - 04 Installation of labeled frames shall conform to National Fire Protection Association Pamphlet No. 80, "Fire Door and Windows" and UL design requirements.
- C. Doors
- 01 Hang doors square, plumb and straight, firmly anchored into position. Eliminate hinge bound conditions and making all items smooth operating. Adjust operable parts for correct functions.
 - 02 Apply hardware in accordance with hardware manufacturer's templates and instructions.
 - 03 Remove hardware, with the exception of prime-coated items, tag box, and reinstall after finish paintwork is completed.
 - 04 Installation of labeled doors shall conform to National Fire Protection Association Pamphlet No. 80, "Fire Doors and Windows" and UL design requirements.
- D. Coordinate with other trades as required for installation of glass and glazing to be installed in doors and frames.
- E. Immediately after erection, sand smooth all rusted and damaged areas of prime coat and apply touch-up with compatible air-drying primer.

END OF SECTION

SECTION 08 14 23.16

PLASTIC LAMINATE FACED WOOD DOORS

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.
- B. Provide hinge prep/placement information to Frame supplier, Coordinate back plate requirement in frame and hardware preparation with approved hardware submittals.

1.2 SUBMITTALS

- A. Manufacturer's specifications and other data of all products proposed to be furnished as needed to prove compliance with specified requirements.
- B. Submit Manufacturer's data sheets, completely describing door construction.
- C. Shop Drawings: show or schedule location, size, thickness, elevation, details of construction, location and extent of hardware blocking, fire rating and other pertinent data for each door required.
- D. Manufacturer's installation instructions.
- E. Samples of plastic laminate colors and patterns for Architect's approval.

1.3 RELATED WORK

- A. Section 08 11 13 – Hollow Metal doors and Frames
- B. Section 08 71 00 – Finish Hardware
- C. Section 08 41 13- Glazed System

1.4 REFERENCES

- A. Underwriters Laboratories:
 - 01 UL Label Fire Door
 - 02 UL 10-C Fire Test
- B. National Codes:
 - 01 National Fire Protection Association NFPA-252
 - 02 IBC (edition having jurisdiction)
- C. Architectural Woodwork Institute

1.5 QUALITY ASSURANCE

- A. High pressure decorative laminate faced doors shall conform to the latest edition of the following standards:
 - 01 WDMA I.S. 1-A
 - 02 AWI Standards and requirements for "Premium Grade".
- B. Tolerances for warp, telegraphing, squareness, and pre-fitting dimensions as per the latest edition of WDMA I.S. 1-A
- C. Each door shall bear an identifying label indicating the manufacturer, door number and order number, as well as fire rating where applicable.

- 1
2 D. Where fire rated doors are required, provide labeled doors. Construction details and
3 hardware application shall be as approved by the labeling agency.
4

5 **1.6 WARRANTY**

- 6
7 A. All doors shall be warranted for the life of the door under normal use against material
8 defects, warping, and delamination of laminate facing and becoming unserviceable.
9
10 B. Any defects noted during the warranty period shall be corrected at no cost to the
11 building owner. Such corrective work shall include all labor and material for repair,
12 replacement, refinishing and re-hanging as required.
13
14 C. Provide manufacturer's executed, written lifetime warranty with closeout
15 documentation.
16

17 **PART 2 - PRODUCTS**

18
19 **2.1 MATERIALS**

- 20
21 A. Solid Core Wood Doors:
22 01 Thickness: 1-3/4 inch
23 02 Core Material: Particle Board Core for non-rated and 20-minute fire-rated doors;
24 mineral for 1-1/2 hour-rated doors.
25 03 Density: 28-32 lb PCF. Comply with particleboard standard ANSI A208.1, Grade 1-
26 LD-2.
27 04 Door Stiles: minimum 1-3/8" (nominal) Structural Composite Lumber (SCL) with
28 minimum 1/16" hardwood veneer suitable for staining or painting to approximate
29 plastic laminate finish as selected by the Architect. HDPL stiles shall not be
30 acceptable.
31 05 Door Rail: minimum 1-3/8" (nominal) Structural Composite Lumber (SCL).
32 Minimum 6" head rail at all doors to receive a closer. Rails shall be sealed with a
33 clear sealer. Where head rail may be visible from a second story vantage point,
34 head rail shall be stained or painted to match stiles.
35 06 Glass Lite Frames / Stops: Metal type with painted finish. Coordinate with other
36 trades as required.
37 07 Seal top, bottom and cut surface of openings at factory with two coats of
38 varnish.
39 08 Vertical door edges shall be factory painted / stained to match door face. Factory
40 shall supply matching paint / stain and edges shall be touched-up in field.
41
42 B. Plastic Laminate
43 01 Vertical grade, 1/16 inch thick.
44 02 Finish shall be as selected by the Architect from manufacturer's full range of
45 colors and finishes.
46 03 Laminate shall be applied to the core by a hot press method using Type 1 exterior
47 grade, water resistant adhesive.
48

49 **2.2 MANUFACTURERS**

- 50
51 A. Doors:
52 01 Assa Abloy
53 02 VT Industries, Inc.
54 03 Weyerhaeuer
55 04 Or Equal
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58
59
60 B. Plastic Laminate:
61 01 Ralph Wilson Plastics, "Wilsonart" (Basis of Design)
62 02 Formica Corp., "Formica"
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PART 3 - EXECUTION

3.1 INSTALLATION

- A. Carefully verify that doors are properly installed at intended door location and that door prep for finish hardware is accurate and complete.
- B. Install all doors plumb and square to frame with +/- 1/8" clearance between door and frame.
- C. Install finish hardware in accordance with approved templates.
- D. Verify that top and bottom rails are sealed prior to door installation.
- E. Take all necessary precautions to protect door finishes before, during and after installation. In the event of damage to the plastic laminate surfacing, replace door.
- F. Do not strip heads of Phillips head screws. Remove and replace all stripped screws.
- G. Upon completion of door installation, cycle door several times to confirm that door, frame and hardware are all installed and functioning correctly.

END OF SECTION

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SECTION 08 41 13

GLAZED SYSTEMS

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Bidders for substitutions.

1.2 SCOPE

- A. Work Included:

- 01 Exterior glass and aluminum framing systems and storefront systems.
- 02 Aluminum glass entry doors.
- 03 Glazing of plastic laminate doors.
- 04 Glazing of hollow metal doors.
- 05 Fixed Aluminum windows (Nail Fin)
- 06 Horizontal Slider Window
- 07 Sealant of window frame to exterior sheathing and window frame to interior rough opening.

- B. Work Specified Elsewhere:

- 01 Section 06 10 00 -Wood Doors and Frames
- 02 Section 08 71 00 – Finish Hardware (coordinate any materials supplied by others).

1.3 SUBMITTALS

- A. Manufacturer's specifications and other data needed to prove compliance with specified requirements.
- B. Manufacturer's complete installation instructions for system(s) proposed to be provided.
- C. Shop Drawings: Complete shop drawings by manufacturer, indicating elevations, sections, substrates, finishes, hardware and installation details. Details shall indicate / include actual details relative specifically to this project; including substrates and interfacing work. Standard, generic details shall not be acceptable.
- D. Samples: Show manufacturer's full range of colors
 - 01 Samples of each type of glass (12" x 12" minimum)
 - 02 In place sample of sealant at frame perimeter for Architect's approval. Architect shall select samples for review from manufacturer's full color line.
 - 03 Obtain hardware templates from finish hardware supplier.
 - 04 Samples of framing finish for approval and fastener types.

1.4 INSTALLATION CONFERENCE

- A. Refer to Section 01420 - Notification of Architect Requirements

1.5 REFERENCES

- A. American National Standards Institute:

1 ANSI 297.1 - 1975 Safety Performance Specification

2 ANSI 297.1 - 1972 Safety Glass Code

- 3
- 4 B. Federal Specifications:
- 5 Fed. Spec. DD-G-001403 B
- 6 Fed. Spec. TT-S-00230 Sealing Compound: Synthetic Rubber Base and TT-S-00203C
- 7 Fed. Spec. TT-S-001657 Sealing Compound: Butyl Rubber Base
- 8 Fed. Spec. DD-G-451d

9

10 **1.6 QUALITY ASSURANCE**

- 11
- 12 A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced
- 13 in the necessary crafts, and who are completely familiar with the specified requirements
- 14 and the methods needed for proper performance of the work of this Section.
- 15
- 16 B. Provide aluminum framing systems, doors, and windows from one source and supplied by
- 17 a single manufacturer.
- 18
- 19 C. In addition to complying with pertinent codes and regulations of governmental agencies
- 20 having jurisdiction, comply with pertinent recommendations contained in:
- 21 01 Flat Glass Marketing Association:
- 22 a. Glazing Sealing Systems Manual
- 23 b. Glazing Manual
- 24

25 **1.7 WARRANTY**

- 26
- 27 A. Submit a written warranty, executed by the entrance manufacturer, agreeing to repair or
- 28 replace units that fail in workmanship within specified warranty period. Failures include,
- 29 but are not limited to:
- 30 01 Structural and performance failures, including excessive deflection, excessive
- 31 leakage, air infiltration beyond specified requirements.
- 32 02 Faulty operation of hardware directly related to items listed above.
- 33 03 Deterioration of metals, metal finishes, and other materials beyond normal
- 34 weathering.
- 35
- 36 B. Manufacturer's warranty period shall be 5 years from date of Substantial Completion.
- 37

38 **PART 2 - PRODUCTS**

39

40 **2.1 PERFORMANCE SPECIFICATIONS**

- 41
- 42 A. Requirements apply simultaneously through the most adverse conditions of each exterior
- 43 application.
- 44 01 Wind loads: Design system to withstand positive and negative wind loads
- 45 normal to the plane of the wall in typical zone at 25 PSF. Wind Load is 110 MPH
- 46 02 Thermal Movement: Provide for noiseless expansion and contraction of all
- 47 materials and assemblies due to temperature changes in a range between 10°F
- 48 and 180°F, without detriment to appearance or performance.
- 49 03 Water Infiltration: Drain water entering at joints and condensation occurring
- 50 within the wall construction to the exterior face of the wall. Allow no
- 51 uncontrolled water other than condensation on the interior face of the wall.
- 52 04 Air Filtration: Limit air leakage to maximum 0.005 cfm/ft² at 6.24 psf. for
- 53 storefront and curtain wall systems.
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55 **2.2 MATERIALS**

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- A. Glass Types:
 - 01 Type G-1 - 1/4 inch glazing quality, with **Solarban 70XL on surface 2 plus “SolarGray” at storefront** tempered glass.
 - 02 Type G-2 - 1/4 inch glazing quality, transparent tempered glass.
 - 03 Type G-3 - 1/4 inch clear wire safety glass, Type 1, Class 1, Kind A, Form 1. Pattern shall be straight diamond mesh or square grid, as selected by Architect.
 - 04 Type G-4 - Insulated Glass – 2 lites of 1/4” tempered glass separated by a 1/2” air space. Air space to be dual sealed and meeting the certification requirements of the IGCC for a CBA rating. **Exterior glazing shall be tempered type G1 glass “solar gray” by Virto; interior glazing shall be clear tempered type G2 glass**

- B. Aluminum Entrance Doors: Oldcastle Building Envelope Model 375 or equivalent product from list of approved manufacturers.
 - 01 Tubular sections: 4 1/4 inch vertical stiles, 3 1/2 inch top rail and 8 1/2 inch overall bottom rail; with 0.125 inch minimum thickness at all tubular sections.
 - 02 ASTM B221, alloy 6063-T5 for extrusions; ASTM B209, alloy 5005-H16 for sheets; or other alloys and temper recommended by manufacturer appropriate for specified finish.
 - 03 Connections: Provide bolted and welded connections, fit to a hairline joint.
 - 04 Provide reinforcing at bolted attachments. Tapped aluminum is not permitted.
 - 05 Provide concealed screws, nuts, bolts, and anchors, except hardware screws on hinge and closer-arm of door, of non-corrosive metal.
 - 06 Finish: Color to be Clear Anodized
 - 07 Glass in Door: Type G-1 at all exterior locations.
 - 08 Use manufacturer’s recommended gaskets for flush glazing (color “black”).
 - 09 Refer to Section 08 71 00 for additional finish hardware requirements. Coordinate with other trades as required.

- C. Aluminum Storefront / Entrance / Window Framing System: Oldcastle Building Envelope Series 3000; or equivalent product from manufacturers list:
 - 01 Size: 2” x 4 1/2” mullion profile; pressure glazed, center set, exterior loaded; available with butt glazed verticals; to accept 1" glazing. Provide sub-frames at door jambs on entrances as required to accept Medium Stile doors.
 - 02 Provide mullion reinforcement, if necessary, to achieve structural requirements to meet loading criteria.
 - 03 Intermediate horizontal mullions shall be undersized a minimum of 1 inch less depth than perimeter / primary framing member size.
 - 04 Finish: Color to be Clear Anodized
 - 05 Glass: G-4 at all exterior locations.
 - 06 Provide sill flashing with end dams

- D. Fixed Aluminum Nail Fin Windows: Ram S800 Heavy Picture Window
 - 01 Size: 1 1/2” x 2 11/16” mullion profile; pressure glazed, back set, exterior loaded; simulated divided lights internal muntin; to accept 1" glazing. Provide standard 1” backset nail fin, except where window abuts concrete foundation, provide applied block frame.
 - 02 Provide mullion reinforcement, if necessary, to achieve structural requirements to meet loading criteria.
 - 03 Intermediate horizontal mullions shall be undersized a minimum of 1 inch less depth than perimeter / primary framing member size.
 - 04 Finish: Clear anodized aluminum.
 - 05 Glass: G-4 at all exterior locations.

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- E. Horizontal Sliding Pass-Thru Assembly: CRL Sharyn (Or Equal)
 - 01 Size: as indicated on drawings, frameless pass-thru window with clamp on roller assembly.
 - 02 Provide track, sliders, retainers, stop, and other necessary accessories to achieve functionality of horizontal sliding units.
 - 03 Finish: Satin anodized aluminum.
 - 04 Glass: G-2

- F. Aluminum:
 - 01 ASTM B221, alloy 6063-T5 for extrusions; ASTM B209, alloy 5005-H16 for sheets; or other alloys and temper recommended by manufacturer appropriate for specified finish.
 - 02 Minimum thickness of 0.125 inch for framing members and 0.050 inch for glazing stops and similar components.

- G. Internal Reinforcing:
 - 01 ASTM A36 for carbon steel; or ASTM B308 for structural aluminum.
 - 02 Shapes and sizes to suit installation.
 - 03 Shop coat steel components after fabrication with alkyd type zinc chromate primer complying with FS TT-P-645.
 - 04 Provide steel reinforcing in aluminum framing as required to achieve specified wind load resistance.

- H. Inserts and Anchorage Devices:
 - 01 Manufacturer's standard formed or fabricated assemblies, steel or aluminum, of shapes, plates, bars or tubes.
 - 02 Hot-dip galvanize steel assemblies after fabrication; comply with ASTM A123, 2.0 ounce minimum coating.
 - 03 Provide all anchoring angles, plates, fasteners and accessories required for secure attachment to adjacent work.

- I. Fasteners:
 - 01 Non-magnetic stainless steel or cadmium plated steel coated with yellow or silver iridescence plating, compatible with materials being fastened.
 - 02 Series 300 stainless steel for exposed locations. Cadmium plated steel with 0.0005 inch plating thickness and color chromate coated for concealed locations.
 - 03 Provide nuts or washers of design having the means to prevent disengagement; deforming of fastener threads is not acceptable.
 - 04 Provide concealed fasteners wherever possible.
 - 05 For exposed locations, provide countersunk flathead fasteners with finish matching item fastened.
 - 06 All fasteners used to secure the sub-sill flashing and sill frame member shall be bedded in sealant at penetrations through window assembly components. Heads of fasteners at these locations shall be covered with sealant.

- J. Sub-Sill Flashing
 - 01 All glazed systems shall be furnished with continuous sub-sill flashing, spanning the full width of the rough opening.
 - 02 Sub-sill flashing shall be minimum 0.065" aluminum with integral (turned up) end dams and back dams. Minimum height of dams shall be 1".
 - 03 Open vertical joint at end dam / back dam junction shall be TIG welded continuous to form a seamless dam component directing any / all trapped water to outside of building.

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- 04 Finish of sub-sill flashing shall match frame finish.

- H. Miscellaneous Materials:
 - 03 Provide material isolators at all dissimilar metals in contact with aluminum framing components.
 - 04 Where indicated on the Drawings provide minimum 0.080" aluminum extrusions or break metal between non-contiguous framing components (i.e. segmented radius walls, column wraps, etc.). Fabricate as required for concealed fastening.

- I. Glazing Materials at Aluminum Framing:
 - 01 Glazing Gaskets: Extruded neoprene conforming to ASTM C-502 (color "black"), sized to fit the frame.
 - 02 Sealant: Comply with Fed. Spec. TT-S-00230

- J. Glazing Materials at Hollow Metal Frames:
 - 01 General: Use glazing compound and preformed glazing sealants approved for the application, except as otherwise specified, conforming to Glazing Materials portion of the FGMA Glazing Manual.
 - 02 Sealant:
 - a. One part acrylic polymer sealant conforming to Fed. Spec. TT-S-00230 or silicone, Fed. Spec. TT-S-0023-C. Use for glazing of all fixed glass. Include primer as recommended by manufacturer.
 - b. Color: Shall as selected by Architect from manufacturer's full range
 - c. All sealants to be compatible w / adjacent material per mfg. instructions.
 - 03 Setting Blocks: Hard rubber or clean grain softwood.
 - 04 Back-up Material: Foamed polyethylene or polystyrene rod stock; sizes as required by joint condition, and compatible with sealant.
 - 05 Glazing Tape: DAP #1202 or as approved.
 - 06 Glazing Gaskets: Extruded neoprene, free of porosity, surface defects, dimensional irregularities, and conforming to physical properties of ASTM C502.
 - 07 Use of metal sash putty will not be permitted, but compound conforming to Fed. Spec. T-G-410 will be permitted. The use of non-skinning compounds, non-resilient type preformed sealers and preformed impregnated type gaskets will not be permitted.

2.4 MANUFACTURERS

- A. Glass:
 - 01 Oldcastle
 - 02 Vitro (Formerly PPG)
 - 03 Ford Glass
 - 04 AFG Industries, Inc.
 - 05 HGP Industries

- B. Aluminum Framing System and Doors:
 - 01 The Vista-Wall Group
 - 02 U. S. Aluminum
 - 03 YKK AP American, Inc.
 - 04 Oldcastle Building Envelope
 - 05 Kawneer

- C. Miscellaneous:
 - 01 Nail Fin Windows: Ram Windows
 - 02 Horizontal Pass-Thru Assembly: CR Laurence
 - 03 Or Equal

1
2 **PART 3 - EXECUTION**

3
4 **3.1 SURFACE CONDITIONS**

- 5
6 A. Thoroughly examine conditions at each and every location under which work of this
7 Section will be performed.
8 01 Verify that each rough opening is the correct size for the framing being installed.
9 Maximum allowable joint at perimeter of framing shall be 5/8". Inform general
10 contractor of any non-conforming rough openings and do not proceed until
11 unsatisfactory conditions are corrected.
12 02 Verify that the sub-sill substrate is continuous, solid, level and at the proper
13 elevation for installation of sub-sill flashing. Sub-sill flashing must be set in a 100%
14 bed of sealant without any voids. Do not proceed until unsatisfactory conditions
15 are corrected.
16
17 B. Verify that wood bloecking, thru-wall flashing, masonry and other adjacent work is
18 installed as required for the proper installation of aluminum framing prior to proceeding.
19 Inform general contractor of any non-conforming work and do not proceed until
20 unsatisfactory conditions are corrected.
21
22 C. Clean glazing channels, stops, and rabbets to receive the glazing materials, making free
23 from obstructions and deleterious substances which might impair the work.
24 01 Remove protective coatings which fail in adhesion or interfere with bond of
25 sealants.
26 02 Comply with manufacturer's' instructions for final wiping of surfaces
27 immediately prior to application of primer and glazing compounds or tapes.
28 03 Prime surfaces to receive glazing compounds in accordance with manufacturer's
29 recommendations.
30

31
32 **3.2 INSTALLATION – ALUMINUM FRAMING**

- 33
34 A. Install all aluminum framing in strict accordance with the manufacturer's installation
35 standards and recommendations; firmly anchored for long life under hard use.
36
37 B. All sill members of fixed frames shall be installed with continuous aluminum sub-sill
38 flashing (with end dams).
39 01 Set sill flashing in 100% bed of sealant.
40 02 All fasteners used to anchor sub-sill flashing shall be completely bedded in
41 sealant prior to installation of sill framing.
42 03 Coordinate with dampproofing sub-contractor to install additional thru-wall
43 flashing at base of jambs to lap over / onto aluminum sub-sill flashing – prior to
44 installation of sill framing member(s). Coordinate as required.
45
46 C. Shim and center framing within rough opening. Maximum sealant joint at perimeter of
47 framing shall be 5/8". Coordinate with other trades to correct rough opening where
48 perimeter joint will exceed 5/8".
49
50 D. Erection Tolerances:
51 01 Maximum Deviation from Vertical: 1/8 inch in any story and 1/4 inch in any 45 foot
52 run.
53 02 Maximum Deviation from Horizontal: 1/8 inch in any 30 foot run.
54 03 Maximum Deviation from True Alignment: 1/32 inch from any two abutting units;
55 and horizontal components meeting at a vertical mullion. Allow no edge
56 projections.
57 04 Maximum Joint Cap: 1/32 inch.

05 Maximum Openings Between Movable Glazing Stop and Adjacent Member: 1/32 inch.

3.3 INSTALLATION – GLASS

- A. Inspect each piece of glass immediately prior to start of installation.
 - 01 Do not install items which are improperly sized, have damaged edges, are scratched, abraded, or damaged in any other manner.
 - 02 Do not remove labels from glass until so directed by the Architect.
 - 03 Install glass so distortion waves, if present, run in a horizontal direction.
- B. Locate setting blocks at sills one quarter of the width of the glass in from each end of the glass, unless otherwise recommended by the glass manufacturer.
 - 01 Use blocks of proper size to support the glass in accordance with the manufacturer's recommendations.
 - 02 Provide spacers for all glass sizes larger than 50 united inches, to separate glass from stops, except where continuous glazing gaskets or felts are provided.
 - a. Locate spacers no more than 24 inches apart, and no closer than 12 inches to a corner.
 - b. Place spacers opposite one another.
 - c. Make bite of spacer on glass 1/4 inch or more.
- C. Set glass in a manner which produces the greatest possible degree of uniformity in appearance.
- D. Do not use two different glazing materials in the same joint system, unless the joint use is approved in advance by the Architect.
- E. Mask, or otherwise protect surfaces adjacent to installation or sealants.
- F. Install all glass, gasket and aluminum framing in strict accordance with manufacturer's printed instructions.
- G. Caulk joints continuous at exterior and interior faces of framing and elsewhere as indicated, as required to meet performance specifications using materials specified in Sealants - Section 07 90 00. Follow sealant manufacturer's printed instructions for the installation of his product.

3.4 PROTECTION

- A. Protect glass from breakage after installation by promptly installing streamers or ribbons, suitably attached to the framing and held free from glass. Do not apply warning markings, streamers, ribbons, or other items directly to the glass, except as specifically directed by the Architect.
- B. Protect all window framing during and after installation from marring, blemishes, scratches and damage due to incidental adjacent work. If damaged, make all necessary repairs or replacements in accordance with the manufacturer's recommendations and as directed by the Architect.

END OF SECTION

1 SECTION 08 71 00

2 FINISH HARDWARE

3
4 CONDITIONS OF THE CONTRACT AND DIVISION 1, AS INDEXED, APPLY TO THIS SECTION.

5
6 PART 1 – GENERAL

7 1.1 RELATED DOCUMENTS

8 1.1.1 Drawings and general provisions of contract, including general and supplementary
9 conditions and Division 01 specification sections, apply to this section.

10 1.1.2 Divisions for access control and fire alarm integrated systems.

11 1.2 SUMMARY

12 A. General – this section includes items known commercially as finish or door
13 hardware that are required for swing, sliding, overhead and folding doors, except special
14 types of unique hardware specified in the same sections as the doors and door frames on
15 which they are installed. This section includes (but is not limited to) the following:

- 16 1. Hinges and pivots
- 17 2. Key control system
- 18 3. Lock cylinders and keys
- 19 4. Lock and latch sets
- 20 5. Bolts and coordinators
- 21 6. Exit devices
- 22 7. Push/pull units
- 23 8. Closers, door control devices, and electromagnetic hold open devices
- 24 9. Stops and overhead holders
- 25 10. Door trim units
- 26 11. Protection plates
- 27 12. Weatherstripping, fire, and smoke seals
- 28 13. Astragals and meeting seals on pairs of doors
- 29 14. Thresholds, gasketing, and door bottoms
- 30 15. Miscellaneous devices
- 31 16. Electrified hardware devices, controls, power supplies, transfers, and
32 wiring diagrams

33 B. Related sections – contain requirements that relate to this section (but are not
34 limited to those listed):

- 35 1. Division 00 and 01 section(s) for sustainable material
36 requirements, windstorm/hurricane code compliance, and
37 blast resistance.
- 38 2. Division 06 section(s) for interior architectural woodwork cabinet
39 hardware.
- 40 3. Division 08 and 10 section(s) for all opening hardware requirements
41 including but not limited to coordination and matching efforts, template
42 requirements, and keyed security.
 - 43 a. All hardware for aluminum storefront swinging doors shall be
44 supplied by this section’s Supplier if not specifically specified in
45 aluminum storefront section.
 - 46 b. All cylinders for locks on overhead type doors, folding doors,
47 wire-mesh sliding doors, accordion type doors, and gates to be
48

1 provided under this section, unless specifically called out to be
2 provided by others in respective sections.
3 c. All “hardware preps” must be covered in the door/frame
4 supplier’s bid. The pricing for finish hardware only covers the
5 products within this document, not the doors/frames respective
6 cutouts/mortise/surface prep required for these items.
7

8 C. References – as specified in this section are subject to the following standards in the
9 most recent code revisions as approved by local building code and as applicable to plan:
10

- 11 1. ADA. The Americans with Disabilities Act – “Title III – Public
12 Accommodations”.
- 13 2. ANSI-A117.1. American National Standards Institute – “Accessible and Usable
14 Buildings and Facilities”.
- 15 3. ANSI/BHMA-156 Series. American National Standards Institute/Builders
16 Hardware Manufacturing Association – “Builders Hardware Standards”.
- 17 4. ANSI A250.13. American National Standards Institute – “Testing and Rating of
18 Severe Windstorm Resistant Components for Swinging Door Assemblies.”
- 19 5. ASTM E330/E1886/E1996. American Society for Testing and Materials –
20 “Uniform Static Air Pressure Difference” / “Cyclic Pressure Differentials”/
21 “Impacted by Windborne Debris in Hurricanes”.
- 22 6. IBC. International Building Code.
- 23 7. NEC. National Electrical Code.
- 24 8. NFPA-80. National Fire Protection Agency – “Standard for Fire Doors and
25 Windows”.
- 26 9. NFPA-101. National Fire Protection Agency – “Life Safety Code”.
- 27 10. State and Local Codes including Authority Having Jurisdiction.
- 28 11. UFAS. Uniform Federal Accessibility Standards.
- 29 12. UL. Underwriter’s Laboratories Testing Services.
- 30 13. UL-10C. Underwriter’s Laboratories – “Positive Pressure Tests of Door
31 Assemblies”.
- 32 14. WHI. Warnock Hersey International Testing Services.
- 33

34 **1.3 HARDWARE SUPPLIER RESPONSIBILITIES**
35

- 36 A. Under the direction of Architect and Hardware Door Consultant to:
37
- 38 1. Key meetings - attend a minimum of two (2) key meetings per project at the
39 location selected by Owner.
40
 - 41 2. Tagging and indexing - tag all keys with permanent tags, assemble key cabinet,
42 and set up electronic cross index system.
43
 - 44 3. Pre-install meeting – provide a pre-installation training meeting for hardware
45 Installer(s) and General Contractor at the job site one (1) week prior to
46 installation of finish hardware.
47
 - 48 4. Instruct Owner – provide a minimum of four (4) hours of key control instructions
49 per project for training Owner’s personnel in the proper adjustment and
50 maintenance of door hardware and hardware finishes at project conclusion
51 training.
52
 - 53 5. Install cores - permanent cores to be installed under the direct supervision and
54 presence of Supplier and Owner's maintenance personnel.
55
 - 56 6. Certify install – at the completion of all work, with Installer(s), General
57 Contractor, and manufacturer’s representative(s), inspect and supervise the
58 adjustment of any piece of hardware not operating correctly, certify in writing that

1 all hardware has been installed per manufacturer's requirements, and provide a
2 written punch list directly to Architect of all outstanding items not completed.
3

- 4 7. Follow-up inspection – approximately six (6) months after the date of substantial
5 completion, meet with representatives of the General Contractor, Installer(s),
6 Owner, and lock, exit, and closer manufacturers, at project site for the following:
7
8 a. Examine and re-adjust each item of door hardware as necessary to
9 restore function of doors and hardware to comply with specified
10 requirements.
11 b. Consult with and instruct Owner's personnel in recommended additions
12 to the maintenance procedures.
13 c. Replace hardware items that have deteriorated or failed due to faulty
14 design, materials, or installation of hardware units.
15 d. Prepare a written report for Owner and Architect of current and
16 predictable problems (of substantial nature) in the performance of the
17 hardware.
18

19
20 **1.4 SUBMITTALS**

- 21
22 A. Submittals – submit the following in accordance with conditions of contract and
23 Division 01 specification sections within two (2) weeks of receipt of an executed
24 purchase order and contract documents.
25
26 1. Product data – manufacturer's technical data for each item of door hardware,
27 installation and mounting instructions, maintenance of operating parts and finish,
28 and other information necessary to show compliance with requirements.
29
30 a. Include templates for doors, frames, and other work specified to be
31 factory prepared for the installation and preparation of door hardware.
32 Contractor to check shop drawings of other work to confirm that
33 adequate provisions are made for locating and installing door hardware
34 to comply with indicated requirements.
35
36 2. Schedule layout – coordinated with doors, frames, and related work to ensure
37 proper size, thickness, hand, function, and finish of door hardware.
38
39 3. Schedule content – based on hardware indicated, organize schedule into
40 "hardware sets" indicating complete designations of each item required for
41 every door or opening. Include the following information:
42
43 a. Type, style, function, size, and finish of each hardware item.
44 b. Model name and manufacturer of each item.
45 c. Fastenings and other pertinent information.
46 d. Location of each hardware set cross-referenced to indications on
47 drawings both on floor plans and in door and frame schedule.
48 e. Explanation of all abbreviations, symbols, and codes contained in
49 schedule.
50 f. Mounting locations for hardware.
51 g. Degree of opening required for all doors with
52 closers.
53 h. Door and frame handing, sizes, and material
54 i. Keying Information
55 j. Supplier performance responsibilities
56
57 4. Samples – as requested by Architect for each type of exposed hardware unit in
58 finish indicated and tagged with full description for coordination with schedule.

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- a. Samples will be returned to supplier. Units that are acceptable and remain undamaged though submittal, review, and field comparison process may, after final check of operation, be incorporated in the work, within limitations of keying coordination requirements.
- 5. Electronic security hardware – coordinate the installation of electronic security with Architect and provide installation and technical data to Architect and other related sub-contractor(s).
 - a. Provide complete wiring diagrams for each opening requiring electrified hardware, except openings where only magnetic hold-opens are specified. Provide a copy with each hardware schedule submitted after approval. Provide a copy with delivery of hardware to job site and another copy to Owner at time of job completion.
- B. Finals – supply the approved schedule and templates for all finish hardware within two (2) weeks of receipt of approved submittal for use by Architect, General Contractor, and affected supplier(s) for all other products. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
- C. Keying submittal - submit separate keying schedule with detailed electronic and paper copies of key structure indicating clearly how Owner's final instructions on keying of locks have been fulfilled.

1.5 QUALITY ASSURANCE

- 1. Single source responsibility – obtain each type of hardware for latch and lock sets, hinges, closers, exit devices, and flat goods from a single manufacturer.
- B. Supplier qualifications – a recognized architectural door hardware supplier, that has exact knowledge and experience with Owner’s current material hardware requirements and supplier performance requirements, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this project, and that employs an experienced hardware consultant who is available to Owner, Architect, and Contractor as requested at reasonable times during the course of the work, for consultation at the jobsite.
- C. Fire-rated openings – provide door hardware scheduled or required for fire-rated openings that complies with UL, NFPA-80, and requirements of Authority Having Jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, Factory Mutual or other testing and inspecting organization acceptable to Authority Having Jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.
 - All required finish hardware components of a fire-rated opening shall be incorporated into any door assembly located within a fire-rated partition.
- 2. Doors and frames used in positive pressure opening assemblies shall meet IBC and UL-10C in areas where this specification includes gasketing for smoke rated openings.
- D. General compliance – Supplier to certify and submit documentation that all hardware supplied complies with all Federal ADA, State TAS, Local IBC Code, Fire Life Safety Code, and additional requirements of doors. Provide a complete list of discrepancies and possible solutions to any opening not meeting requirements.

1.6 PRODUCT HANDLING

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- A. Packaging – door hardware is the responsibility of Supplier. As material is received by Supplier from various manufacturers, sort, tag, and repackage in containers clearly marked with appropriate hardware set number or correct item code to match set numbers or item code of approved hardware schedule. Include basic installation instructions with each item or package.
- B. Delivery – Supplier to deliver packaged door hardware items promptly to location as directed by General Contractor.
- C. Inventory – General Contractor to inventory door hardware jointly with representatives of Supplier and Installer(s) at job site at delivery until each is satisfied that count of the delivery is correct.
- D. Site control – General Contractor to provide secure lock-up for door hardware delivered but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the work will not be delayed by hardware losses both before and after installation. Replace any hardware lost or misplaced at own expense to meet construction schedule.

1.7 MAINTENANCE

- A. Supplier to furnish a complete set of as-built hardware schedule, installation instructions, specialized tools, and maintenance instructions for all products supplied for Owner’s continued adjustment, maintenance, and removal and replacement of door hardware at the Owner key control training. Final payment will not be released until this item has been completed fully.

1.8 WARRANTY

- A. All finish hardware shall be supplied with a minimum two (2) year warranty against defects in materials and workmanship commencing with substantial completion of the project except as follows:

- 1. All closers to have a minimum ten (10) year written warranty.
- 2. All exit devices to have a minimum five (5) year written warranty.
- 3. All locksets to have a minimum five (5) year written

warranty.

PART 2 – PRODUCTS:

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Butt hinges and pivots:
 - a. Ives, div.
Allegion
 - b. Hager
Hinge Co.
 - c. McKinney, div.
 - 2. Cylinders:

Assa Abloy

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- a. Schlage/Falcon, div.
Allegion
- b. No Sub
- 3. Key cabinet:
 - a. Key Control
Systems, Inc.
 - b. Telkee, Inc.
 - c. MMF
Co.
- 4. Locks and latches:
 - a. Schlage, div.
Allegion
 - b. No Sub
- 5. Exit and panic devices:
 - a. Von Duprin, div.
Allegion
 - b. No Sub
- 6. Overhead and smoke-activated closers:
 - a. LCN, div. Allegion
 - b. No Sub
- 7. Push/Pull trim, protection plates, bolts, and other auxiliary hardware:
 - a. Ives, div.
Allegion
 - b. Hager Hinge
Co.
 - c. Rockwood, div.
Assa Abloy
- 8. Weatherstripping, seals, astragals and thresholds:
 - a. Hager
Hinge Co.
 - b. Pemko, div. Assa
Abloy
- 9. Miscellaneous items:

2.2 MATERIALS AND FABRICATION

- A. Base metals – produce hardware units of basic metal and forming method indicated, using manufacturer’s standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units as

1 determined by respective ANSI/BHMA A156 series standards for each type of hardware item
2 and by ANSI/BHMA A156.18 for finish designations indicated. Do not furnish “optional”
3 materials or forming methods other than those indicated, except as otherwise specified.

- 4 B. General fasteners – provide hardware manufactured to conform to published templates,
5 generally prepared for machine screw installation. Do not provide hardware that has been
6 prepared for self-tapping sheet metal screws, except as specifically indicated.
7
8 1. Furnish screws for installation with each item. Provide Phillips flat-head screws
9 except as otherwise indicated. Finish exposed (exposed under any condition)
10 screws to match hardware finish, or if exposed in surfaces of other work, to match
11 finish as closely as possible including “prepared for paint” surfaces to receive
12 painted finish.
13
14 2. Provide concealed fasteners for hardware units that are exposed when door is
15 closed except to the extent that no standard units of type specified are available
16 with concealed fasteners. Do not use through-bolts for installation where bolt head
17 or nut on opposite face is exposed in other work unless their use is the only means
18 to fasten the hardware securely. Where through-bolts are used as a means of
19 reinforcing the work, provide sleeves for each though-bolt or use sex screw
20 fasteners.
21

22 2.3 HINGES, BUTTS, & PIVOTS

- 23
24 A. Locations – except for hinges and pivots to be installed entirely (both leaves) into wood
25 doors and frames, provide only template-produced units. For fire-rated doors provide steel
26 or stainless steel bearing type. Tips shall be flat button and matching plug,
27 finished to match leaves, except where hospital tips (HT, Ives) are indicated. Provide ball
28 bearing (BB in lieu of PB, Ives) on all of the following door types: high frequency, exterior
29 non-means of egress, doors with closers, restrooms, fire-rated, and sound
30 sealed doors.
31
32
33 B. Sizes – except as otherwise indicated, provide hinges as follows: 5 knuckle heavy duty full
34 mortise template type 4.5” x 4.5” standard weight for all 1-3/4” doors up to and including
35 3’4” wide. For all doors over 3’4” wide, provide 4.5” x 4.5” heavy weight hinges (HW
36 Suffix, Ives). For all doors over 1-3/4” through 2” thick provide 5” x 5” hinges.
37
38 C. Number of hinges – provide number of hinges indicated, but not less than one (1)
39 continuous or three (3) mortise butt hinges per door leaf for doors 90” (86” at fire-rated
40 doors) or less in height and one (1) additional hinge for each 30” of additional height.
41
42 D. Screws – provide Phillips flat head screws complying with the following requirements with
43 screw head finish to match surface of hinges or pivots:
44
45
46 1. Metal doors and frames – install machine screws into drilled and tapped holes or
47 self-drilling screws on continuous hinges.
48
49 2. Non fire-rated wood doors and frames – install wood screws.
50
51 3. Fire-rated wood doors – install #12 x 1-1/4”, threaded-to-the-head steel wood
52 screws.
53

2.4 CYLINDERS AND KEYING

- A. Keying system – equip locks with cylinders for interchangeable core pin tumbler

inserts. Provide temporary construction cores for all keyable devices for the construction period; Supplier to remove and replace with permanent cores when directed. Provide final cores and keys for installation by Supplier.

- B. Key ways – provide all lockable devices to be compatible with Owner’s keying structure requested that comply with performance requirements for Grade 1 as listed in ANSI/BHMA A156.5, have been tested for pick and drill resistance requirements of UL 437, and which are UL listed for fire resistance.
- C. Key structure – comply with Owner’s instructions for master keying, and, except as otherwise indicated, provide individual change keys for each lock that is not designated to be keyed alike with a group of related locks. All interchangeable cores shall be stamped with the appropriate keying symbol for that core. Reference section HARDWARE SUPPLIER RESPONSIBILITIES for key meeting requirements.
 - 1. Permanently inscribe each key with cylinder manufacturer’s key symbol and notation “DO NOT DUPLICATE”.
 - 2. Provide concealed key control on all cores.
- D. Key material – provide keys of nickel silver only.
- E. Key quantity – provide three (3) change keys for each lock, five (5) master keys for each master system, and five (5) grandmaster keys for each grandmaster system, or in quantities as directed by Owner at the key meeting for multi-use rooms.
 - 1. Provide one (1) extra key blank for each lockable device.
 - 2. Provide ten (10) extra zero bitted cores.
 - 3. Provide key quantities equal to 125% of all classrooms for staff common use rooms.
 - 4. Provide two (2) additional copies of all master keys directly to Owner or district.
- F. Cylinder housing and cores – provide for all keyable exit device trim and applicable keyed options, keyed removable mullions, aluminum storefronts, overhead, accordion, wire partitions, package doors, and folding doors as required by each specific door or hardware type.
- G. Key cabinet – provide key cabinet(s) including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with

1 capacity for 150% of the total number of keyable devices required for the project. Provide hinged-panel
2 type cabinet(s) for wall mounting. Reference section HARDWARE SUPPLIER RESPONSIBILITIES for
3 tagging and indexing requirements.

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- 1. KC1 – Part #201-8390-03, MMF. Key Cabinet.

- H. Electronic index – provide complete electronic cross index system. Index to include architectural door mark number, key symbol, bitting, tag number, Owner’s door designation name or number, and number of keys provided.

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2.5 **LOCKS, LATCHES, BOLTS, ASTRAGALS, AND EXIT DEVICES**

- A. Locks and latches – All locks shall have passed over 3 million cycle test and Supplier shall provide test data for verification at submittal. Provide locks and latches with function as required per room. Provide on all doors without push/pulls, exit devices, hospital latches, and flush bolts. Latch guard shall be provided on all reverse handed exterior doors with locksets. Latch guard shall be provided in models as required for door material type, lock strike dimensions, and thru-bolted.
1. Lock functions – lever design shall be Rhodes lever design. Default to a single keyed function (office, classroom, or storeroom) if required function for any opening is in question. Where rabbit door stiles are indicated, provide special rabbit front on locks and latch units and bolts.
2. Strikes – provide manufacturer’s standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set, unless otherwise indicated.
- a. Provide extra long strike lips for locks used on frames with applied wood or aluminum casing trim.
- b. Provide roller type strikes where recommended by manufacturer of the latch and lock units.
- c. Provide standard strike plates for interior doors of residential units where wood door frames are used.
3. Lock throw – provide ½” minimum latch throw for other bored and pre- assembled locks and ¾” minimum latch throw for mortise locks. Provide 5/8” minimum latch throw on pairs of doors. Provide 1” minimum throw for all dead bolts. Comply with UL requirements for throw of bolts and latch bolts on fire- rated openings.
4. Lock backset – provide standard commercial backset. Adjust backset as required for coordination with surface applied hardware which would prohibit standard backset application.
- B. Flush bolts, overlapping astragals, and coordinators – provide minimum of ½” diameter rods of brass, bronze, or stainless steel with minimum 12” long rod for inactive leaf of pairs up to 7’0” in height. Provide longer rods as necessary for doors exceeding 7’0” in height. Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.
- C. Exit devices – provide lockable lever trim panic devices on all means of egress doors, door exiting from rooms of assembly, electrical closets that contain more than 1200 amps as required by NEC, and ALL reverse handed doors from locker rooms. Provide with device style, lever design to match lock levers, fire-rating, windstorm-rating, and sized per door height and width requirements. Provide double egress doors with panic devices with non-lockable trim. Provide all required components to insure all labeling and code requirements are satisfied. Provide shims where devices are required to span across glass lites which would interfere with level installation. All devices shall be though-bolted with sex bolts to the door and contain a sound deadening feature. Provide non-rated openings with dogging to keep latch bolt retracted when engaged and with visual indication of dogging status. Rim exit devices are to be used at all doors except double egress where surface vertical rod devices shall be used, or fire- rated pairs requiring a combination of mortise and vertical rod type as required by labeling authority. Pairs of doors at locations with mullion to have mullions equipped with “keyed cylinder” option and be furnished with mullion storage kits and applicable mullion stabilizers.

1 **2.6 PUSH/PULLS AND HOSPITAL LATCHES WITH ADDITIONAL DEADBOLTS**

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3 A. Provide push/pulls on all non-rated entry foyer, atrium, multi-use restrooms, kitchen to
4 serving, cafeteria/dining to serving, straight handed locker room doors. Provide hospital
5 latches on rated doors in lieu of push/pulls unless doors are a means of egress. Provide all
6 doors with push/pulls or hospital latches with a classroom deadbolt. Provide manufacturer’s
7 standard exposed fasteners for installation.
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10 **2.7 CLOSERS AND DOOR CONTROL DEVICES**

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12 A. Manual closers – provide with full covers on all door openings in fire/smoke rated
13 partitions, means of egress, elevator machine rooms, electrical rooms, interior storage
14 rooms over one-hundred square feet, rooms with sound seals, all rooms with a toilet, and
15 exterior conditions except for mechanical and storage rooms. Provide closers at all
16 corridor doors, except non-rated classrooms.
17

- 18 1. Special considerations – closers shall be added to all out-swinging doors in exit
19 access or secondary communicating corridors (corridors other than exit access).
20 Doors swinging from secondary communicating corridors shall require closers if:
21 a. Doors and/or partitions are indicated as fire-
22 rated.
23 b. Room function defined elsewhere in this specification requires a closer.
24 c. The corridor provides egress travel to an exit access for an occupant load
25 greater than fifty (50) persons.
26
27 2. Sizes of units – except as otherwise specifically indicated furnish “multi-sized”
28 closers with “barrier-free delayed closing” option to meet ADA and TAS
29 requirements. Where manual closers are indicated for all doors required to be
30 accessible to the physically handicapped, provide adjustable units complying with
31 ANSI A117.1 provisions for door opening force and delayed action closing where
32 indicated. Provide mounting brackets suitable for the style and swing of the door.
33 Installer shall mount all closers on room side unless instructed otherwise by
34 Architect. On doors with coordinators provide mounting brackets to span the
35 coordinator. On aluminum storefront doors provide a drop mounting plate to
36 accommodate the narrow top rail, if required.
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39 B. Electro-magnetic holders – provide units designed to hold door in open position under
40 normal usage and to release and close door automatically under fire conditions.
41 Incorporate an integral electromagnetic holder mechanism designed for use with UL
42 288 listed fire detectors, provided with normally closed switching contacts.
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48 **2.8 DOOR TRIM AND PROTECTION UNITS**

49 A. Edge trim – stainless steel to fit door thickness and 36” in height at kitchen to serving and
50 custodial closets.
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52 B. Protection plates – fabricate face protection plates not more than 1-1/2” less than door
53 width on push side of door by height indicated on single doors and 1” on each leaf for
54 pairs. Provide protection plates for all doors with closers a minimum of 10” height, except
55 provide 36” height at non-rated custodial closets and kitchen to serving. All metal
56 protection plates to be of stainless steel, 0.050” thick. (U.S. 18 gage). Provide
57 manufacturer’s standard exposed fasteners for door trim units consisting of either
58 matching screws or self-tapping screws.
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2.9 WEATHERSTRIPPING AND SEALS

- A. Provide continuous weatherstripping on all exterior, mechanical room, and electrical room doors. Provide light or sound seals on light or sound sensitive doors. Provide non-corrosive fasteners for exterior applications. Size weatherstripping and seals to opening size. Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.
 - 1. Weatherstripping at exterior jambs, mullions, and heads – provide bumper-type resilient insert and metal retainer strips, surface applied unless shown as mortise or semi-mortised, and of the following metal finish and resilient bumper material. Extruded aluminum with natural anodized finish, manufacturer’s standard color selections, or finish to match. Minimum 0.062” thickness of main walls and flanges.
 - 2. Smoke seals – provide at interior openings as required by IBC on 3 sides to accommodate door sizes for all fire-rated doors and elevator machine rooms. Intumescent fire seals on 3 sides to accommodate door sizes for all fire-rated wood doors over 20 minute fire-ratings to meet IBC requirements if wood door specification does not require seals to be built into the edges of doors.
 - 3. Silencers – all doors not utilizing seals should be provided with mutes in design as required by frame manufacturer.
 - 4. Sound seals – provide at sound sensitive doors.
 - 5. Light seals – provide at light sensitive doors.

2.10 THRESHOLDS AND DOOR BOTTOM SWEEPS

- A. Except as otherwise indicated, provide standard metal threshold unit of type, size, and profile required at all exterior, mechanical, electrical, and interior doors separating non-conditioned and conditioned spaces. Provide units that meet ADA and TAS requirements. Undercut on doors to be adjusted to function as intended with applicable thresholds. Provide rain drips for all frames exposed directly to rain (no overhang on building).
 - 1. Thresholds and door bottom sweeps – provide threshold consisting of metal, design, and finish sized to entire opening width. Extruded aluminum with color anodized finish as selected from manufacturer’s standard color, range, natural, or finished to match. Provide units not less than 4” wide, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit entire door width. Provide units with saddle threshold and exterior surface mounted door bottom drip-sweep combination unit.
 - 2. Drip cap – provide with width four (4)” wider than the size of the door at locations indicated.

2.11 DOOR STOPS, VIEWERS AND COAT HOOKS

- A. Door stops – provide wall stops at all doors that can open without hitting an obstruction and where a wall exists within the width of the door at 180° of open. At all exterior non-means of egress doors, provide overhead surface mounted stops and with a hold-open feature. At exterior means of egress doors provide a heavy-duty floor stop projecting into the floor. This requirement is in addition to all closer requirements.

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- B. Viewers – provide door viewers at all kitchen vendor back door entrances and where indicated by plans. Mount door viewer(s) to allow a minimum 180° viewing angle.
 - C. Coat Hooks – provide coat hooks at all stall doors if not provided by toilet accessory or toilet partition suppliers.

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2.12 HARDWARE FINISHES

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- A. Acceptable finishes – plated Satin Chrome, painted, and powder coated. Powder coated in similar finish is acceptable on closers. Anodized equal is acceptable where plating is not available or the commercially recognized standard. If finish selected above cannot be directly matched by product, a similar finish or paintable finish shall be provided.
 - 1. General – provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with the manufacturer’s standards, but in no case less than specified by referenced standards for the applicable units of hardware.
 - 2. Standard – The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18, “Materials and Finishes”, including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
 - a. Provide finishes that match those established by BHMA or, if none established, match Architect’s sample.
 - 3. Lacquers – provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix “- NL” is used with standard finish designations to indicate “no lacquer”.
 - B. Matching and coordination – match items to the manufacturer’s standard color and texture finish for the latch and locksets (or push/pull units if no latch/locksets).
 - 1. Hardware components for storefront/specialty doors shall be coordinated with Architect/Owner and are to be compatible to the door finish as indicated in respective section(s), regardless of finish designations indicated herein.

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2.13 MISCELLANEOUS ITEMS

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- A. Knox Box – provide a 3200-Series with swinging door, tamper resistant electric switches and mortise kit “RMK” as manufactured by The Knox Company. Verify exact type required with the district fire marshal.

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PART 3 – EXECUTION:

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3.1 INSTALLATION

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- A. Pre-Install meeting – please reference section HARDWARE SUPPLIER RESPONSIBILITIES for pre-installation meeting requirements.
 - B. Standards – mount hardware units at heights indicated in the following applicable publications, except as specifically indicated by Architect or required to comply with governing regulations:

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- 1. Door Hardware Institute – “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames” and “Recommended Locations for Builders Hardware for Custom Steel Doors and Frames”.
 - 2. Texas Accessibility Standards & Americans with Disabilities Act mounting heights. When these two standards conflict, notify Architect and/or AHJ before installation of product.
- C. Coordination – install each hardware item in compliance with the manufacturer’s instructions and recommendations and hardware submittal requirements.
- 1. General – set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation
 - 2. Painting/Finishes – where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in Division 09 “Paintings and Coatings”. Do not install surface mounted items until finishes have been completed on the substrates involved. Remove all protective film prior to installation of mounting screws. Protect all finishes as required during construction to maintain original finish
 - 3. Fasteners – drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
 - 4. Thresholds – set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 07 “Joint Sealers”.
 - 5. Weatherstripping – comply with manufacturer’s instructions and recommendations to the extent installation requirements are not otherwise indicated for weatherstripping and seals.
- D. Electronic hardware – upon completion of any electronic security hardware installation, Contractor to verify that all components are working properly and state in the required guarantee that this inspection has been performed.
- E. Permanent core install and certify install - reference section HARDWARE SUPPLIER RESPONSIBILITIES for permanent core installation and certification of installation requirements.

3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjusting – adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
- 1. Where door hardware is installed more than one (1) month prior to acceptance or occupancy of a space or area, Installer(s) shall return to the installation during the week prior to acceptance or occupancy and make final check and

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adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

- B. Cleaning – clean adjacent surfaces soiled by hardware installation. Clean all hardware finishes and return to new condition or replace prior to Owner’s occupancy.
- C. Instruct Owner and Follow-up – please reference section HARDWARE SUPPLIER RESPONSIBILITIES for demonstration/follow-up requirements.

END OF SECTION

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SECTION 09 28 16

GYPSUM WALLBOARD SYSTEMS

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 for substitutions.

1.2 SCOPE

- A. Work Included:
- 01 Gypsum board walls, Interior and Exterior
 - 02 Expansion Joints and accessories
 - 03 Gypsum board ceilings and resilient channel
- B. Related Work Specified Elsewhere:
- 01 Section 06 10 00 – Rough Carpentry
 - 02 Section 05 55 00 – Metal Fabrication
 - 03 Section 07 21 13 - Building Insulation
 - 04 Section 09 51 00 - Acoustical Lay-In Ceilings
 - 05 Section 09 90 00 – Painting and Staining

1.3 SUBMITTALS

- A. Product Data: Manufacturer's specifications and other data for all products proposed to be furnished as needed to prove compliance with specified requirements.
- B. Third-party test results of documentation that metal framing products meet specified performance and physical properties.
- C. Manufacturer's installation instructions for all products proposed to be furnished.

1.4 REFERENCES

- A. ANSI A97.11

American Society for Testing and Materials (ASTM):

- 01 ASTM C 473 – Standard Test Methods for Physical Testing of Gypsum Panel Products.
- 02 ASTM C 475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- 03 ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board.
- 04 ASTM C954-10 – Standard Specifications for Steel Drill Screws for the Application of Gypsum Panel Products to Steel Studs
- 05 ASTM C1002 – 07 - Standard Specifications for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products to Steel Studs
- 06 ASTM C1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

07 ASTM C 1396 - Standard Specification for Gypsum Board.

Gypsum Association:

01 GA-214 - Recommended Levels of Gypsum Board Finish.

02 GA-216 - Application and Finishing of Gypsum Panel Products.

1.5 DESIGN REQUIREMENTS

A. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

B. Impact-Resistant Characteristics: No structural failure at 400 foot-pounds per ASTM E 195.

C. Mold-Resistant Characteristics: Rating of 10 according to ASTM D 3273 mold testing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers or bundles bearing name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.

C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or damage metal corner beads and trim.

PART 2 - PRODUCTS

2.1 WALL AND CEILING BOARD MATERIALS:

A. General Design Basis: All gypsum wallboard shall be USG 5/8 inch thick, Type X, tapered-edged. Sizes shall be 4'-0" wide by longest practical length to minimize joints.

01 Suitable for use in fire rated assemblies.

B. Humidity Resistant Gypsum Wallboard shall be USG 5/8", Type X, Sheetrock "Mold Tough" gypsum panels.

01 Panels shall comply with ASTM D3273.

02 Use at all walls in high humidity rooms (locker rooms, shower rooms / stalls, food service areas / rooms, restrooms, non-air-conditioned interior spaces / rooms) that do not receive a ceramic tile finish.

03 Also provide within 24" of all sinks and lavatories.

C. Ceramic Tile Substrate: A Glass Matt backer board manufactured specifically for ceramic tile substrate and use in wet locations. Use as wallboard substrate at all ceramic tile finished surfaces.

01 Minimum 5/8 inch thick

02 Provide / install in greatest size sheets possible (48" x 96" or larger) to minimize joints.

03 Use joint reinforcement and fasteners in accordance with manufacturer's printed instructions.

04 Acceptable manufacturers / products include:

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- a. USG "Durock Glass Mat" (basis of design)
 - b. Or Equal
- D. General Design Basis: All exterior sheathing shall be USG 1/2 inch thick, Fiberglas Mat Sheathing. Sizes shall be 4'-0" wide by longest practical length to minimize joints.
- 01 Suitable for use near moisture.
- E. Corner Beads: No. 28 gauge galvanized steel, 1 1/4 inch legs. Use at all exterior corners.
- F. Joint Compound (Taping): Standard types manufactured by gypsum wallboard manufacturer for intended use. Fire rated type must be used on fireproof systems.
- G. Laminating Adhesives: Standard type manufactured or recommended by manufacturer of product to be laminated.
- H. Control Joints: Metal type with 1/4-inch open joint, perforated flanges for floating in place.
- 01 Niles Building Products model 093 Zinc Control Joint; or equal.
 - 02 Control joints shall be located vertically a maximum of 30'-0" O.C. floor to above ceiling; each side of door frames from top of jamb to above ceiling; and at building expansion joints full length unless detailed or specified otherwise.
- I. Fasteners: (screws) shall be U.S.G. type "S" drywall screws, minimum 1-1/4" length, or longer as required to penetrate metal framing components a minimum of 1/2".
- J. Resilient Channel: Furnish and install RC Channel at right angles to c joists in all hallways for additional acoustical properties where ceilings fasten to joists.
- K. Acoustical sealant: Furnish and install sealant at inside corners of ceiling to wall board and wall board to foundation in all locations shown to receive additional acoustical properties.

2.3 MANUFACTURERS:

- A. Gypsum Wall Board: Provide domestically manufactured gypsum wall board.
 - 01 U. S. Gypsum Co. (basis of design)
 - 02 National Gypsum Company
 - 03 Georgia Pacific
 - 04 Temple-Inland Forest Products Corp.
- B. Humidity Resistant Gypsum Wallboard
 - 01 U. S. Gypsum Co., "Mold Tough" (basis of design)
 - 02 Or Equal
- C. Ceramic Tile Substrate &
 - 01 USG "Durock Glass Mat" (basis of design)
 - 02 Or Equal
- D. Acoustical Sealant
 - 01 U. S. Gypsum Co., Sheetrock Brand Acoustical Sealant
 - 02 Or Equal
- E. Fiberglas Mat Sheathing
 - 01 Georgia Pacific "Densglas Gold" (Basis of Design)
 - 02 Or Equal

- 1 E. Substitutions of above must be approved by the Architect 10 days prior to proposal / bid
2 date.

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4 **PART 3 - EXECUTION**

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6 **3.1 WALLBOARD INSTALLATION**

- 7
8 A. Select the maximum practical length to minimize end joints. All end joints shall be neatly
9 fitted and staggered. Joints on opposite sides of partition shall be so arranged as to
10 occur on different studs.
11
12 B. Install metal corner bead at external corners. Where length of the corner does not
13 exceed standard stock lengths, use a single length.
14
15 C. Install gypsum board 1/2 inch above surface of slab to prevent wicking of moisture.
16
17 D. Install metal trim where indicated and all wallboard not terminating under frames or
18 behind bases shall be trimmed with galvanized "J" mold.
19
20 E. Level 5 Finish-Apply at least three coats of joint compound over beads, screw heads and
21 trim, and each coat shall be feathered out onto panel faces.
22
23 F. Float out and sand joints to make joints invisible when painted with non-texture paint.
24
25 G. Apply complete skin coating of compound to walls, sanded smooth. Walls & Ceilings to
26 remain smooth. Provide sample for Architect/Owners approval prior to commencement.
27
28 H. Caulk around pipes, ducts, structure or similar items which penetrate drywall systems.
29
30 I. Fasten wallboard at 12 inches o.c., except at the edges/joints which shall be at 8 inches
31 o.c.
32
33 J. Edge-Grip Clips: Position clips on the back of the panels and drive prongs into panel
34 edges. Space clips 16 inches o.c. Screw-attach clip to framing, furring or wall surface.
35
36 K. At all wrap-around metal frames, gyp board shall extend 1/2" minimum into frame throat.
37
38 L. At all exterior metal-framed walls extend gypsum wall board from floor to deck unless
39 noted otherwise.
40

41
42 **3.2 CEILING FRAMING INSTALLATION**

- 43
44 A. Resilient Channel shall be spaced not over 16" OC in the opposite direction of main joist,
45 and within 6 inches of the ends of main runners and of boundary walls, girders or similar
46 interruptions of ceiling continuity. Do not place over 16" o.c., properly positioned and
47 leveled.
48

49 **3.3 CEILING BOARD INSTALLATION**

- 50
51 A. Apply gypsum board of maximum practical length with the long dimension at right angles
52 to the furring channel and fastened with 1 inch drywall screws spaced 12 inches o.c. in the
53 field of the board and along abutting ends.
54
55 B. Align abutting end or edge joints over the web surface of the furring channel. Tie neatly
56 and accurately with end joints staggered.

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3.4 COMMENCEMENT RESTRICTIONS

A. Interior gypsum wallboard and ceiling board installation may not commence until the individual floor is dried in or roofing is complete, roof top equipment openings are covered and flashed, and exterior wall openings are protected.

3.5 PROTECTION AND CLEAN UP

A. Coordinate with painting and make sure all gypsum board is primed and the specified texture is provided.

B. Unless the Construction Manager gives notice otherwise, in advance. Each Trade Contractor is responsible for removing his own trash from the Work area and for the initial cleaning of his own Work, while ongoing and when completed.

01 Garbage Collections: Provide a collection can at each location on the site used as an eating area.

02 Trash Removal: Clear the building and site of trash at least once a week. When rapid accumulation occurs, make more frequent removal. Remove highly combustible trash such a paper and cardboard daily.

03 Disposition Of Debris: Remove debris from the site and make legal disposition. Locations for disposal shall be of the Contractor's choice within the above restrictions. No debris or material may be buried or burned at the site. Take necessary precautions to prevent accidental burning of materials be avoiding large accumulations of combustible materials.

C. The Work shall be turned over to the Construction Manager/Owner in immaculate condition. Cleaning includes removal of smudges, marks, stains, fingerprints, soil, dirt, paint spots, dust, lint, discolorations and other foreign material.

D. Remove all temporary facilities.

END OF SECTION

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SECTION 09 30 13

CERAMIC TILE

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's product data for all products proposed to be furnished.
- B. Samples:
 - 01 Selection: Submit full range of manufacturer's colors, patterns, textures and finishes available for selection.
 - 02 Approval: Submit samples of selected tile mounted on 12" x 12" board indicating joint size and grout.
- C. Certification: Provide Master Grade Certificate as specified in ANSI A137.1.
- D. Installation Instructions: Manufacturer's installation instructions for this application.
- E. Maintenance: Manufacturer's recommended maintenance procedures.

1.3 INSTALLATION CONFERENCE:

- A. Refer to Section 01 32 29- Notification of Architect Requirements.

1.4 REFERENCES

- A. ANSI/TCA A 108.5 - Ceramic Tile installed with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
- B. ANSI/TCA A 108.6 - Ceramic Tile installed with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy
- C. ANSI/TCA A108.10 - Grout Installation
- D. ANSI/TCA A 118.1 - Dry-Set Portland Cement Mortar
- E. ANSI/TCA A 118.4 - Latex Portland Cement Mortar
- F. ANSI/TCA A118.6 - Grout
- G. ANSI/TCA A 136.1 - Organic Adhesives for Installation of Ceramic Tile, Type 1 and Type 2
- H. ANSI/TCA A 137.1 - Specifications for Ceramic Tile
- I. American National Standard Specification for the Installation of Ceramic Tile
- J. TCA - Handbook for Ceramic Tile Installation

1 **PART 2 - PRODUCTS**

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3 **2.1 INTERIOR TILES**

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5 A. Ceramic Tile:

- 6 01 Floor Tile: (T-1) Marazzi Modern Formations
7 a. 12" x 24" field tile.
8 b. 6" x 12" (T-1) single coarse cove base with formed cove base outside
9 corner, or approved equals. Where indicated
10 c. Colors: Canyon Taupe Unpolished
11 d. 1/8" Grout Joint
12
13 02 Wall Tile: (T-2) Marazzi Modern Formations
14 a. 12" x 13" Chevron Mosaic.
15 b. 6" x 12" (T-1) single coarse cove base with formed cove base outside
16 corner, or approved equals. Where indicated
17 c. Colors: Canyon Taupe Unpolished
18 d. 1/8" Grout Joint
19
20 03 Wall Tile: (T-3) Trinity Tile Moda
21 a. 10"x 12" Mosaic.
22 b. Colors: Arena
23 c. 1/8" Grout Joint
24
25 04 Wall Tile: (T-4) Daltile Artigiano Venice Statue
26 a. 3"x12" Tile.
27 b. Colors: AR-96 Glossy
28 c. 1/8" Grout Joint
29
30 05 Shapes: Provide cove wall tile base, and necessary trim shapes to terminate tile
31 with a bullnose edge and rounded external corners. Provide square
32 internal vertical corners and ceiling wall joints.
33
34 06 Unless specifically indicated on the Drawings, tile patterns shall be submitted for
35 review noting joint placement, expansion joints, and orientation of tiles.
36

37 B. Mortar Adhesive and Grout:

- 38 01 Portland Cement: ASTM C-150, Type 1
39 02 Lime: ASTM C-206, Type "S"
40 03 Sand: ASTM C-144
41 04 Water: Potable
42 05 Bond Coat: Dry-set mortar conforming to ANSI A118.1 or A118.4
43 06 Organic Adhesive: Comply with ANSI A136.1. Furnish current Certification of
44 Conformance.
45 07 Grout:
46 a. As recommended by tile manufacturer.
47 b. For tiles larger than 15" (one direction) use medium bed mortar with 90%
48 mortar contact. Size trowel accordingly.
49 c. Color selected by Architect; reference finished schedule for initial color
50 selections to be confirmed via submittals.
51

52 **2.2 EDGE PROTECTION**

53 A. Schluter edge protection:

- 54 01 Provide "schiene" edge protection where tile abuts drywall or vinyl wall
55 covering, (Re: Interior elevations).
56 02 Color: Aluminum

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2.3 EXPANSION JOINTS

A. Silicone compound sealant over filler. Provide at all wall corners, ceilings, control joints and changes in materials. (Minimum of every 12' o.c.e.w. elsewhere.) Do not cut tile to form straight line expansion joint, tooth expansion joint sealant at staggered joints.

2.4 EXTRA TILE

A. Deliver an unopened box of each color of each type of tile to the Owner at Substantial Completion.

2.5 MANUFACTURERS

- A. Ceramic Tile:
 - 01 Marazzi, Dal-Tile, Trinity Tile (Basis of Design)
 - 02 Interceramic Tile and Stone Gallery
 - 03 American Olean Tile Co.
 - 04 Emser Tile
 - 05 Or Equal

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examination: Examine substrates for expansion joints and defects which may affect the work. Do not start work until defects have been corrected. Ensure that surfaces are:
 - 01 Dry, clean, free of oily or waxy films, free of curing compounds.
 - 02 Firm and level within specified tolerances.
 - 03 Minimum of 40°F and rising.
- B. Tile contractor shall examine preparatory work by others and notify Architect of any imperfections which would affect a satisfactory completion of this tile work. Verify that slab is free of cracks, waxy or oily films, and is well cured. Absence of such notification shall constitute acceptance of responsibility by tile contractor.

3.2 INSTALLATION

- A. Reference interior elevations for installation pattern as well as approved submittals showing patterns and joint placement.
- B. Where partial tile are required, saw-cut to provide straight, flush, smooth edges.
- C. Set interior wall tile in accordance with T.C.A. Spec. W-242-90 for gypsum board substrate. Set interior wall tile on CMU in accordance with T.C.A. Spec. W-211-90.
- D. Set floor tile and grout in accordance with T.C.A. Spec. F112-90. (Allow a minimum of 24 hours after tiles are set before grouting.) Slope tile to floor drains.
- E. Lay out tile so that the minimum size tile used is 1/2 size.
- F. Form internal angles square.
- G. Install expansion joints in accordance with T.C.A. Publication EJ171-90.

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- H. At inside corners of intersecting walls, provide non-grouted, sealed joints.
- I. Damp cure grout in accordance with manufacturer's recommendations.
- J. Clean all tile surfaces upon completion. Protect finish tile work from damage.

END OF SECTION

SECTION 09 50 00

WOOD PANEL CEILINGS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes

1. Solid Wood and Wood veneer ceiling panels
2. Exposed grid suspension system
3. Acoustical Infill Panels
3. Wire hangers, fasteners, main runners, wall angle moldings and accessories.

B. Related Sections:

1. Section 09 54 26 - Suspended Wood Ceilings
2. Section 09 51 00 - Acoustical Ceiling Assemblies
3. Section 09 28 16 - Plaster and Gypsum Board
4. Division 23 - HVAC
5. Division 26 - Electrical

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

- 1) ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
- 2) ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
- 3) ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
- 4) ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- 5) ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

- 6) ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
- 7) ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
- 8) ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
- 9) ASTM E 1264 Classification for Acoustical Ceiling Products

1.4 SUBMITTALS

- A. Comply with Section 00 21 16.
- B. Product Data: Manufacturer's specifications and technical data.
- C. Samples: submit two units for each type of grill unit, suspension system and accessories.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide ceiling panel units and grid components by a single manufacturer.

B. Fire Performance Characteristics: Identify ceiling components with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristics: As follows, tested by HPVA (Hardwood Plywood and Veneer Association) under the test standard ASTM E-84 tunnel test and complying with ASTM E 1264 for Class A products.

a. Flame Spread: 25 or less

b. Smoke Developed: 50 or less

C. Woodworking Standards: Manufacturer must comply with specified provisions of Architectural Woodworking Institute quality standards.

D. Woodworks Panels: As with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

E. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to building insulation, wet work i.e. gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store the wood veneer ceiling panels in a dry interior location in their cartons prior to installation to avoid damage. Store the ceiling panel cartons in a flat, horizontal position. Do not remove the protectors between the panels until installation.

B. Do not store in unconditioned spaces with humidity greater than 55 percent or lower than 25 percent relative humidity and temperatures lower than 50 degrees F or greater than 86 degrees F. Do not expose the wood veneer ceiling panels to extreme temperatures, for example, close to a heating source or near a window with direct sunlight.

C. Handle ceiling units carefully to avoid chipped edges or damage to units in any way.

1.7 PROJECT CONDITIONS

A. Prior to installation, the wood veneer ceiling materials are required to reach room temperature and have stabilized moisture content for a minimum of 72 hours.

B. Do not install the wood veneer panels in spaces where the temperature or humidity conditions vary greatly from the temperatures and conditions that will be normal in the occupied space.

C. As interior finish products, the wood veneer panels are designed for installation in temperature conditions between 50 degrees F and 86 degrees F, in spaces where the building is enclosed and HVAC systems are functioning and will be in continuous operation. Relative humidity should not fall below 25 percent or exceed 55 percent.

1.8 WARRANTY

A. Wood Veneer Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to:

1. Ceiling Panels: Defects in materials or factory workmanship
2. Grid System: Rusting and manufacturing defects

B. Warranty Period:

1. Wood veneer panels: One (1) year from date of installation
2. Grid: One (1) year from date of installation

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.9 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Ceiling Units: Furnish quantity of full-size units equal to 3.0 percent of amount installed.

2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ceiling Panels:

1. Armstrong World Industries, Inc.
2. Or Equal

B. Acoustical Infill Panels:

1. Armstrong Ceiling Solutions
2. Or Equal

C. Suspension Systems:

1. Armstrong World Industries, Inc.
2. Or Equal

2.2.1 WOOD VENEER CEILING UNITS

A. Ceiling Panels Type AP:

1. Surface Texture: Smooth
2. Composition: Wood
3. Species/Finish: Grille Walnut
4. Size: 12 in x 96 in
5. Reveal: Backer & Dowel

6. Acoustical Infill Panel: Bio acoustic infill panel- Black Matte
7. Sabin: N/A
8. Edge Banding and Trim: To match face veneer
9. Noise Reduction Coefficient (NRC): ASTM C 423, Classified with UL label on product carton 0.75
10. Flame Spread: ASTM E84 HPVA Fire Classification (Fire Class)
11. Dimensional Stability: Standard
12. Acceptable Product: WOODWORKS Grille, Item # 7099BD as manufactured by Armstrong World Industries

B. Ceiling Accessories (Ceilings) WoodWorks:

1. 5687 - Backer Clip
2. 7891 - 12 Gauge Hanger Wire
3. SH12 - Support Hanger

2.3.1 METAL SUSPENSION SYSTEMS

A. Components:

Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

a. Structural Classification: ASTM C 635 Heavy Duty duty

b. Color: Tech Black and match the actual color of the selected ceiling tile, unless noted otherwise.

c. Acceptable Product: PRELUDE XL 15/16" Exposed Tee as manufactured by Armstrong World Industries

B. Attachment Devices:

Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties:

ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.

D. Wood Works Edge Moldings and Trim:

1. 7800 - 12' Wall Molding

2.4.1 ACOUSTICAL INFILL PANELS

A. Acoustical Infill Panels: Item # 6657 BioAcoustic Infill Panel 11"x 48"x 5/8"

Provide additional acoustical value with the addition of Bio Acoustic infill panels in matte black applied to the upper side of the wood panels.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out.
- B. Proper designs for both supply air and return air, maintenance of the HVAC filters and building interior space are essential to minimize soiling. Before starting the HVAC system, make sure supply air is properly filtered and the building interior is free of construction dust.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

3.3 INSTALLATION

A. Install suspension system and panels in compliance with ASTM C636; CISCA Seismic Guidelines; approved construction drawings; with the authorities having jurisdiction; and in accordance with the manufacturer's installation instructions.

B. Install wall moldings at intersection of suspended ceiling and vertical surfaces.

3.4 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of ceilings panels, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

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SECTION 09 51 00

ACOUSTICAL LAY-IN CEILING

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SCOPE

- A. Suspension System
- B. Acoustical Ceiling Boards

1.3 SUBMITTALS

- A. Comply with Section 00 21 16.
- B. Product Data: Manufacturer's specifications and technical data.
- C. Samples: submit two units for each type of acoustical unit, suspension system and accessories.

1.4 INSTALLATION CONFERENCE

- A. Refer to Section 0142 - Notification of Architect Requirements.

1.5 QUALITY ASSURANCE

- A. Projection Conditions
 - 1. Do not install acoustical ceiling until building is enclosed, sufficient heat is provided, dust-generating activities have terminated and overhead mechanical work is completed, tested and approved.
 - 2. Maintain temperature at minimum 60 degrees F° and humidity if 40% to 50% prior to, during, and after installation.
- B. References
 - 1. American Society for Testing Materials:
 - ASTM C635
 - ASTM C636
 - ASTM E795
 - ASTM E84
 - 2. Underwriters Laboratories assembly, as noted on drawings.

1.7 WARRANTY

- A. Lifetime system warranty to withstand conditions up to 104°F, 95% relative humidity without visible sagging.

1 **PART 2 – PRODUCTS**

2
3 **2.1 MATERIALS**

4
5 **A. Suspension System:**

- 6 01 Typical Grid Type “A”: Prelude XL 15/16” Exposed Tee
- 7 a. Pre-painted standard cold-rolled steel electro-zinc coated (ASTM C635)
 - 8 b. UL 1-hour rated assemblies and 1-hour rated assemblies as indicated on
 - 9 drawings (where it is noted on the Finish Schedule).
 - 10 c. Color: Low sheen satin (typically white).
 - 11 d. Main runners & cross tees to be 1 11/16 inches.
 - 12 e. Approved hold down clips.
- 13
- 14 02 Typical Grid Type “B”: Suprafine XL 9/16” Exposed Tee
- 15 a. Pre-painted standard cold-rolled steel electro-zinc coated (ASTM C635)
 - 16 b. UL 1-hour rated assemblies and 1-hour rated assemblies as indicated on
 - 17 drawings (where it is noted on the Finish Schedule).
 - 18 c. Color: Low sheen satin (typically white).
 - 19 d. Main runners & cross tees to be 1 11/16 inches.
 - 20 e. Approved hold down clips.
- 21
- 22 03 Grid for Type “C” Lay-in Boards:
- 23 a. Same as typical grid, except with an aluminum cap (factory white flat
 - 24 finish).

25
26 **B. Hanger Wire:**

- 27 01 12-gauge steel wire
- 28 02 Spacing at 4'-0" o.c. both directions, wrapped tightly at least 3 full turns.
- 29

30 **C. Lay-in Board:**

- 31 01 Type “A”: suitable for humid areas up to but not including standing water
- 32 A. Armstrong Cirrus (none directional)
 - 33 B. #563
 - 34 C. White Finish
 - 35 D. Class A Fire Rating
 - 36 E. HumiGuard Plus
 - 37 F. Medium Texture
 - 38 G. Mineral Fiber
 - 39 H. 24 in. X 24” in. X 3/4 in.
 - 40 I. Square Lay-In Edge Detail
 - 41 J. NRC=0.75
 - 42 K. CAC=35
 - 43 L. Light reflectance= 0.85
- 44
- 45 02 Type “B”: suitable for humid areas up to but not including standing water
- 46 A. Armstrong Ceramaguard Fine Fissure (none directional)
 - 47 B. #607
 - 48 C. White Finish
 - 49 D. Class A Fire Rating
 - 50 E. HumiGuard Plus
 - 51 F. Medium Texture
 - 52 G. Mineral Fiber
 - 53 H. 24 in. X 24” in. X 5/8 in.

- 1 I. Square Edge Detail
- 2 J. NRC=0.55
- 3 K. CAC=38
- 4 L. Light reflectance= 0.82
- 5
- 6 03 Type "C":
 - 7 a. Un-perforated vinyl face on gypsum board
 - 8 b. 24" x 24" x 1/2" thick
 - 9 c. 2-hour rated assembly (ASTM C635), Class "A"
 - 10 d. Color: White
- 11
- 12 D. Accessories:
 - 13 01 At all locations (whether detailed or not) where an acoustical lay-in ceiling abutts
 - 14 a gypsum board ceiling in the same plane, provide a "W" shaped reveal or
 - 15 "shadow" molding similar to USG #MS 174.
 - 16 02 Provide Kenbeck Flexmold at all curved ceiling edges.

17

18 **2.2 MANUFACTURERS**

- 19
- 20 A. Armstrong World Industries, Inc. (Basis of Design)
- 21
- 22 B. U. S. Gypsum
- 23
- 24 C. CertainTeed
- 25
- 26 D. Donn Products, Inc.
- 27
- 28 E. Or Equal
- 29

30

31 **PART 3 - EXECUTION**

32

33 **3.1 PREPARATION**

- 34
- 35 A. Ensure that walls are flat and wall corners square. Commencing work shall be construed
- 36 as acceptance of preceding work performed by others, as suitable to receive work
- 37 specified in this Section.
- 38
- 39 B. Ensure that wall control joints are flat and will not cause wall mold to misalign at those
- 40 locations.
- 41
- 42 C. Coordinate all locations of cut tile with Architect in field, prior to commencing work.
- 43
- 44 D. Do not install any ceiling tile until all above ceiling inspections and corrections have been
- 45 completed.
- 46

47 **3.2 SUSPENDED CEILING SYSTEMS**

- 48
- 49 A. Install ceiling systems by skilled workmen in accordance with manufacturer's printed
- 50 instructions, the approved shop drawings and reflected ceiling plans. Exposed surfaces of
- 51 acoustical units shall be level and flush, with all joints straight and true. Cutting and fitting
- 52 around all items protruding through acoustical ceiling shall be done neatly. Edge
- 53 moldings and runners shall have flush hairline joints, with all corners mitered.

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- B. Install main beam and cross tees in accordance with reflected ceiling plans. Suspend main beams from structure above (but not bridging), by means of #12 gauge galvanized wire, located 4 feet on center. Join cross tees to main beam with a positive interlock. At perimeter areas, secure angle molding to vertical surfaces, ends of tees to rest on bottom flange of molding.
- C. Align beams or tees with angle molding at corners, unless authorized by Architect.
- E. Attachment of grid members to wall molding with pop rivets is not permitted. Hanger wire at 45 degrees, approximately 10 inches long may be used to tie the grid to the wall above the ceiling to prevent eventual disengagement of the two components.

3.3 EXTRA STOCK

- A. Deliver two (2) unopened cartons of each type of ceiling board at completion of job to location as directed by owner.

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SECTION 09 54 23

LINEAR METAL CEILING

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SCOPE

- A. Concealed suspension system for Linear Metal Ceiling Panels.
- B. Linear Metal Ceiling Panels for concealed suspension system.
- C. Trim and accessories.

1.3 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Product Data: Manufacturer's specifications and technical data.
- C. Samples: submit two units for each type of acoustical unit, suspension system and accessories.

1.4 QUALITY ASSURANCE

- A. Projection Conditions
 - 1. Do not install linear metal ceiling until building is enclosed, sufficient heat is provided, dust generating activities have terminated and overhead mechanical work is completed, tested and approved.
 - 2. Maintain temperature at minimum 60 degrees F° and humidity if 40% to 50% prior to, during, and after installation.
- B. References
 - 1. American Society for Testing Materials:
 - ASTM A641
 - ASTM C423
 - ASTM C635
 - ASTM E580
 - ASTM E84
 - 2. Underwriters Laboratories assembly, as noted on drawings.

1.5 WARRANTY

- A. Manufacturers: All materials, wood ceiling and grid, shall be warranted for (1) one year for material and workmanship.
- B. Installer: All work shall be warranted for (1) year from final acceptance of completed work.

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PART 2 – PRODUCTS

2.1 MATERIALS

- A. “Woodright Ceilings” LINEAR METAL CEILING PANELS AND SUSPENSION SYSTEM
 - 01 Exterior Soffit: Linear Panels for exterior installations

- B. METAL SUSPENSION SYSTEMS, GENERAL
 - 01 Carrier: Universal hat shaped, .038-inch roll-formed aluminum section with hook shaped tabs spaced to receive ceiling panels at 2 inches on center and 27/32 inch apart. Support holes spaced 4 inches on center. Finish: Factory applied black enamel.
 - 02 Attachment Devices: 12 gage galvanized carbon steel hanger wire. Per manufactures installation handbook.
 - 03 Panel Splice: Formed aluminum insert designed to snap-fit between two ends.

- C. LINEAR METAL CEILING PANELS
 - 01 Basis of Design: Woodright, By Hunter Douglas Architectural Products.
 - 1) Panel Profile: Box 8 (.032” Exterior)
 - 2) Member Size: 7 5/32” x 5/8”
 - 3) Edge Profile: Square- Matching Edge Banding
 - 4) Reveal: 5/8”
 - 5) Perforation: Non-perforated
 - 6) Assembly Style: Carrier Mounted
 - 7) Panel Sizes: 8” x longest length possible’ (Nom)
 - 8) Fire Rating: NA
 - 9) Finish: Decorated Powder Coat- Color to be Walnut
 - 10) Reveal: Black, Flat recessed closure
 - 11) End Cap: Furnish at terminal end of panel runs, as required

2.2 MANUFACTURERS

- A. Hunter Douglas
- B. Or Equal

PART 3 - EXECUTION

3.1 PREPARATION

- A. Ensure that walls are flat and wall corners square. Commencing work shall be construed as acceptance of preceding work performed by others, as suitable to receive work specified in this Section.

- B. Layout: Measure each ceiling area and establish the layout of Linear Metal Ceiling Panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders and conform to the layout shown on reflected ceiling plans in accordance with wood ceiling manufacturer’s approved Shop Drawings.

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3.2 INSTALLATION

A. Install ceiling systems by skilled workmen in accordance with manufacturer's printed instructions, the approved shop drawings and reflected ceiling plans. Exposed surfaces of acoustical units shall be level and flush, with all joints straight and true. Cutting and fitting around all items protruding through acoustical ceiling shall be done neatly. Edge moldings and runners shall have flush hairline joints, with all corners mitered.

C. General: Per manufacturer installation handbook

01 Attachments: Suspend ceiling hangers from building's structural members per manufacturer's instructions and in compliance with all local codes and regulations.

02 Installation of universal carrier: Install, align, brace, tie-off, mount, handle interferences, and space suspension carrier in accordance with suspension manufacturer's instructions and in compliance with all local codes and regulations.

03 Installation of Linear Metal System "Box 8": Install Linear metal ceiling panels in accordance with manufacturer's installation instructions and in compliance with all local codes and regulations. Install with undamaged edges and fitted accurately to suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit, as required. **Panels shall be toothed at corners por intersections, not mitered. Cap ends with factory fabricated end caps,** all panels shall be square cut, field trim only when absolutely necessary, in accordance with manufacturers guidelines.

04 Suspension Runners: Install suspension system runners so they are square and securely interlocked with one another. Install number and use on-center spacing per ceiling manufacturer's instructions, as indicated on approved Shop Drawings and in compliance with all local codes.

3.3 CLEANING

A. General: Clean exposed wood surfaces of Linear Metal Ceiling Panels. Comply with manufacturer's instructions for cleaning and touchup of minor finish damage. Remove and replace wood ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

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SECTION 09 61 19

CONCRETE FLOOR SEALER

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SUBMITTALS

- A. Refer to Section 01 33 00 Submit manufacturer's data.

PART 2 - PRODUCT

2.1 MATERIALS AND MANUFACTURERS

- A. ZEP Manufacturing "ZEP Stain Resistant Floor Sealer"
- B. Or Equal

PART 3 - EXECUTION

- A. Concrete slabs shall be smooth, dry, and free of any foreign materials.
- B. Apply two coats of specified finish in strict accordance with manufacturer's instructions.
- C. Allow approximately 24 hours drying time between installations of coats. Do not apply second coat until Architect has inspected first coat application.
- D. Install coating after all painting operations are completed.
- E. Apply any painted stripes or graphics indicated on drawings. Allow approximately 24 hours drying time between installation and additional coats.
- F. Apply two (2) additional coats of concrete floor sealer over any areas receiving striping or graphics as specified above. (Total for striped areas is 4 coats.)

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SECTION 09 64 53

LUXURY VINYL TILE FLOORING

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 SUBSTITUTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SCOPE

- A. Luxury Vinyl Tile/Plank
- B. Resilient Rubber Cove Base
- C. Metal Transitions Trim

1.3 RELATED WORK

- A. All other Division 9 flooring specifications.

1.4 SUBMITTALS

- A. Product Data. Manufacture's specification data and installation instructions.
- B. Samples. Submit full range of colors and patterns of actual materials proposed to be furnished for Architect's selection.
- C. Maintenance Data. Include in the final close-out documents the maintenance data describing the procedure to be followed in maintaining the materials.
- D. Asbestos Free Materials. Provide a written notarized statement indicating that all materials used are totally asbestos free.

1.5 QUALITY ASSURANCE

- A. Must Comply with ASTM C1028 and ASTM D2047

PART 2 - PRODUCTS

2.1 LUXURY VINLY TILE/PLANK:

- A. Materials:
 - 01 LVT-1
 - a. Manufacturer: Tarkett
 - b. Collection: Urban Stone
 - c. Color: Terra
 - d. Size: 18"x36" Vertical Ashlar
 - e. Installation Method: adhesive, suitable for high foundation moisture
 - 02 LVT-1

- 1 a. Manufacturer: Tarkett
- 2 b. Collection: Exotic Wood PCEX
- 3 c. Color: Kingwood
- 4 d. Size: 6"x36" Herringbone Pattern
- 5 e. Installation Method: adhesive, suitable for high foundation moisture
- 6
- 7 B. Patterns and Colors: Patterns to be determined depending on final product selections,
- 8 starter planks minimum length to be at least 10" in length.
- 9

10 **2.2 LUXURY VINYL TILE MANUFACTURERS:**

- 11
- 12 A. Armstrong
- 13 B. Others- Approval based on actual submission of materials.
- 14

15 **2.3 RESILIENT MATERIALS**

- 16 A. Materials
- 17 01 Base:
 - 18 a. Type. Tarkett Millwork Masquerade Reveal
 - 19 b. Height. 4 1/8 inches
 - 20 c. Thickness. Full 0.25"
 - 21 d. Color. MF4- White Oak Espresso
- 22
- 23 B. Primers and Adhesives
 - 24 01 Concrete Slab Primer: Non-staining type as recommended by material
 - 25 manufacturer.
 - 26 02 Adhesives: Waterproof, stabilized type as manufactured by resilient material
 - 27 manufacturer.
 - 28

29 **2.4 METAL TRANSITION TRIM**

- 30 A. Materials
- 31 01 Transitions: Centiva-Tandus Metal Edge Trim
 - 32 a. Type. ME001
 - 33 b. Located: LVT to Carpeting and LVT to Tile transitions
 - 34 c. Height. As applicable to approved LVT and carpet
 - 35 d. Width. 2.5"
 - 36 e. Finish: Iron Stone
- 37

38 **2.5 ADHESIVES**

- 39 A. Provide high moisture range glues that are approved by the luxury vinyl tile
- 40 manufacturer.
- 41

42 **2.6 RESILIENT MATERIAL MANUFACTURERS**

- 43
- 44 A. Tarkett (Basis of design)
- 45 B. Roppe Rubber Co.
- 46 C. Or Equal
- 47

48 **PART 3 - EXECUTION**

49 **3.1 INSPECTION**

- 50
- 51
- 52 A. Examine the areas and conditions under which work of this Section will be performed.
- 53 Correct conditions detrimental to timely and proper completion of the work. Do not
- 54 proceed until unsatisfactory conditions are corrected.
- 55
- 56 B. Subfloors:

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- 01 Verify that substrate is smooth, level, at required finish elevation, and without more than 1/8 inch in 10'-0" variation from level or slopes shown on the drawings.
- 02 Prior to laying materials, broom clean or vacuum the surfaces to be covered, and inspect the subfloors.

3.2 INSTALLATION

- A. General:
 - 01 Install materials only after finishing operations (including painting), have been completed, and after permanent heating and cooling system is operating.
 - 02 Verify that moisture content of concrete slabs, building air temperature, and relative humidity are within the limits recommended by the manufacturers of the materials used.

- B. Installing LVT Planks:
 - 01 Place units with adhesive in strict compliance with the manufacturer's recommendations.
 - 02 Butt units tightly to vertical surfaces, nosings, edgings, and thresholds.
 - 03 Scribe, as necessary, around obstructions and to produce neat joints.
 - 04 Place tiles tightly laid, even, and in straight parallel lines.
 - 05 Extend units into toe spaces, door reveals, and in closets and similar spaces.
 - 06 Lay units from center marks established with principal walls, discounting minor offsets, so that units at opposite edges of the room are of equal width.
 - a. Adjust as necessary to avoid use of cut widths less than 2 inches wide at edge of space.
 - b. Lay units square to axis of the room or space.
 - 07 Match units for color and pattern by using materials from cartons in the same sequence as manufactured and packaged.
 - 08 Place resilient edge strips tightly butted to units and secured with adhesive, providing at all unprotected edges, unless otherwise shown.

- C. Installing Base:
 - 01 Install base on solid backing. Adhere tightly to wall and floor surfaces.
 - 02 Use factory-preformed exterior corners, and factory preformed or job-mitered interior corners.
 - 03 Scribe and fit to doorframes and other obstructions.
 - 04 Install base on all casework as shown, unless otherwise noted.

3.3 CLEANING AND PROTECTING

- A. Remove excess adhesive and other blemishes from exposed surfaces, using neutral cleaner recommended by the manufacturer of the resilient materials.

3.4 EXTRA STOCK

- A. Deliver to the Owner for his future use an extra stock of two unopened boxes of each color and pattern of planks selected, and one container of base adhesive.

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SECTION 09 68 00

CARPET

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 MANUFACTURER'S WARRANTY

- A. Manufacturer shall warrant the carpeting for 15 years against the following defects:
- 01 Dimensional stability including curling.
 - 02 Edge ravel.
 - 03 Delamination of backing.
 - 04 Wear in excess of 10% by weight.
- B. Manufacturer shall warrant that the generation of static electricity shall not exceed 3.5 KV at 70°F at 20% RH for the life of the carpet.

1.3 SUBMITTALS

- A. Shop drawings to the Architect showing layout of all seams and cross seams, location, and type of carpet accessories.
- B. Certificate showing manufacturer's loom on which carpet will be produced, and date of last inspection for specification tolerances.
- C. Samples showing manufacturer's matching color (12" x 12"). Actual base and accessory samples.
- D. Actual sample from loom to produce run of carpet.
- E. Manufacturers product data including base adhesive.
- F. Maintenance instructions.

1.4 SCOPE

- A. Furnish and install all carpet as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide carpet free of any irregularities in weave or materials, and each color of one dye lot. Carpet shall be moth and vermin-proof, and pre-shrunk carpet.
- B. Materials:
- 01 C-1A
 - a. Manufacturer: Tarkett
 - b. Collection: Perta

- 1 c. Color: Thundercloud
- 2 d. Size: 24"x 24" tiles, Monolithic
- 3 e. Installation Method: adhesive, suitable for high foundation moisture

- 4
- 5 02 C-1B
- 6 a. Manufacturer: Tarkett
- 7 b. Collection: Perta
- 8 c. Color: Thundercloud
- 9 d. Size: 18"x 36" tiles, Herringbone pattern
- 10 e. Installation Method: adhesive, suitable for high foundation moisture

- 11 03 C-2
- 12 f. Manufacturer: Tarkett
- 13 g. Collection: Abrasive Action II
- 14 h. Color: Germinate
- 15 i. Size: 24"x 24" tiles, Monolithic
- 16 j. Installation Method: adhesive, suitable for high foundation moisture

- 17
- 18 C. Carpet Accessories and Adhesive (refer to Section 09 64 53, Resilient Materials):
- 19 01 Standard accessories as recommended by the successful carpet manufacturer.
- 20 02 Adhesive as recommended by carpet manufacturer.

21

22 **2.2 MANUFACTURERS**

- 23
- 24 A. Tarkett (Basis of design)
- 25
- 26 B. Or Equal

27

28 **PART 3 - EXECUTION**

29

30 **3.1 PREPARATION**

- 31
- 32 A. Deliver carpet to the job site in original mill scrapings, if full rolls. Store carpet raised
- 33 above floor, under cover, and in well ventilated spaces, as soon as delivered. Protect
- 34 carpet from damage, dirt, stains, and moisture.
- 35
- 36 B. The floor shall be clean and free of any foreign substances, such as wax, paint, oil, etc.
- 37
- 38 C. Cracks and holes shall be filled with latex emulsion filler compatible with adhesive.
- 39
- 40 D. Any ridges and high spots in concrete surface shall be brought to the attention of the
- 41 Architect and the General Contractor.

42

43 **3.2 INSTALLATION**

- 44
- 45 A. General:
- 46 01 Adhere directly to floor using no pad and no foam. Roll carpet with a roller to
- 47 ensure maximum contact at the pressure recommended by the manufacturer.
- 48 02 Scribe carpet accurately to all vertical surfaces.
- 49 03 Align lines of carpet as woven, using no fill strips less than 15 cm (6") in width,
- 50 laying all carpet in same direction unless specifically otherwise directed by the
- 51 Architect.
- 52
- 53 B. Seams:
- 54 01 Locate seams only where shown on approved shop drawings or where otherwise
- 55 approved by Architect.

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- 02 Fabricate seams by the compression method, using a butt joint, and properly bead and seal. Do not stretch seams.
- 03 Brush out or roll out air bubbles toward seam.
- 04 Do not use floor adhesive to bead cut edge. Use regular seam adhesive.

C. Clean Up:

- 01 Thoroughly clean all carpet surfaces prior to final acceptance of the carpeted areas by Owner. Leave work in neat, uniform condition, vacuumed and ready for use.
- 02 Any spillage of adhesive on the face of the carpet shall be removed immediately with a clean-up solvent recommended by the manufacturer.
- 03 Avoid traffic for at least twelve hours after installation.
- 04 Carpet contractor shall repair any and all damage done by his workmen.
- 05 Provide traffic areas with heavy Kraft paper or "Visqueen" to protect against damage and soiling. Provide such protection when directed by the Architect.

3.3 EXTRA CARPET

- A. After completion of the carpet installation, the carpet subcontractor shall provide an additional 3% of total yards installed of carpet (Planks) to the Owner for future carpet replacement that may be required. This extra stock is to be unused planks and does not include scraps.

3.4 GUARANTEE

- A. The carpet installer shall be required to re-lay any carpet that does not provide an attractive wrinkle-free appearance, and shall correct any condition due to faulty installation, which may appear for a period of one year from date of substantial completion.

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SECTION 09 78 00

PLASTIC LAMINATE WALL PANEL SYSTEMS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.
- B. Provide plastic laminate wall panel surfacing wall panel surfacing material as shown and specified, and in accordance with the Contract Documents,

1.2 SUBMITTALS

- A. Product Data: Manufacturer's literature / cut sheets fully describing the materials proposed to be furnished.
- B. Samples: Submit sample of each type and color to be installed, for approval by the Architect.
- C. Installation Instructions: Manufacturer's installation instructions for this application.
- D. Certificate of Compliance: Submit certificate from manufacturer that wall surfacing used meets architectural specification requirements.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in manufacturer's cartons, properly labeled and identified.
- B. Store materials in undamaged condition as packaged by the manufacturer.
- C. Take care to prevent damage during delivery, handling and storage.
- D. Store all materials flat and in a clean, dry storage area where temperatures shall be maintained above 50° Fahrenheit.
- E. The wall surfacing must be allowed to condition for at least 24 hours at a temperature of 70°F, prior to beginning installation.

1.4 JOB CONDITIONS

- A. Installation environment shall be stable and controlled.
- B. Wall temperature during installation shall be at least 70°F, and shall not exceed 100° Fahrenheit.
- C. Relative humidity shall not exceed 90 percent.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Wall Panel System:
 - 01 Wall panel system shall be produced by Panel Specialists, Inc., Temple, Texas. Type 312 Reveal with standard decorative laminate surface in color(s) as selected by Architect.
 - 02 Provide mold 304 at panel edge, as required.

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- 03 Shall meet requirements of Class A Interior Finish Material, as defined by the National Fire Protection Association Life Safety Code 101.
 - 04 Shall meet requirements of Class 1 Interior Finish Material, as defined by Standard Basic Building Code.
 - 05 Material shall have been tested by Underwriters Laboratories, Inc., in accordance with ASTM E-84, Surface Burning Characteristics of Building Materials. Results of UL testing shall be published by the manufacturer.
- B. Accessory Trim Components: To be provided by the manufacturer and/or specified by the Architect. Stainless Steel reveals between the panels as drawings.
 - C. Adhesives: as recommended by the manufacturer of wall surfacing material.
 - D. Plastic Laminate Manufactures:
 - 01 Wilsonart
 - 02 Formica
 - 03 Or Equal

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine wall surfaces before beginning installation, to determine that they are sound, dry, clean and ready for installation of surfacing material.
- B. Correct defects that could affect quality of finished installation.
- C. Plaster and masonry surfaces shall contain no more than 5.5% moisture.
- D. Beginning installation shall be construed as evidence of acceptance of conditions under which installation will be conducted.

3.2 INSTALLATION

- A. Hang panels in strict accordance with manufacturers written instructions.
- B. Any variation in color or pattern shall be immediately communicated to the manufacturer's representative for his inspection, before proceeding with the installation.

3.3 CLEAN-UP

- A. Immediately clean excess adhesive from wall surfacing and accessory trim, by following adhesive manufacturer's instructions printed on the container label.
- B. Upon completion of work, remove surplus materials, rubbish and debris, resulting from the wall panel installation. Leave areas in neat, clean and orderly condition.

END OF SECTION

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SECTION 09 90 00

PAINTING AND STAINING

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SUBMITTALS

- A. Material lists: Give the supplier's name, product name, number and generic description of each proposed product and its use. Provide product data sheets if requested.
- B. Samples: Submit full range of colors, patterns, textures and finishes available for selection, including the following:
- 01 Color Chips: Provide complete duplicate sets of color chips for color selection.
 - 02 Small Applied Samples: Provide pieces of actual material on which paint will occur with minimum dry mil thickness of specified paint.
 - 03 Sheen Samples: Provide full range of varying sheens when sheens are controllable by intermixing.
- C. Installed Samples: Provide large size samples for approval. Approved samples may be left in place as part of the work.
- D. One room and/or area, as selected by the Architect, shall be painted with materials specified or accepted and applied directly from container, unthinned. After acceptance by Architect, room and/or area shall be standard of quality of entire project.
- E. Certification: Furnish a letter certifying that materials submitted are truly equivalent, or better than those called out in the finish schedule.

1.3 RESPONSIBILITY OF COORDINATION

- A. Coordinate the work specified herein with the following work:
- 01 Provide information to preceding trades for proper preparation of substrate.
 - 02 Inspect substrate before proceeding to verify proper preparation.
 - 03 Notify Architect of any item to receive paint which may not be covered by a scheduled finish type. Architect will furnish appropriate specification.

1.4 QUALITY ASSURANCE

- A. Materials shall be applied directly from containers in which material is purchased. No exceptions.
- B. Subcontractor shall provide to Owner and Architect a notarized certification that paint used is as specified in writing by the Architect.
- C. Number of coats of each of several finishes shall be in accordance with detailed specifications, which will produce first quality finish if properly applied. If number of coats specified fails to produce a finish acceptable to Architect, this Contractor shall apply additional coat(s) at his own expense until an acceptable finish is achieved.

- D. Provide primers and other undercoat paints produced by same manufacturer as finish coats. Use thinners recommended by paint manufacturer's printed instructions.
- E. Deliver products to jobsite in unbroken containers bearing manufacturer's labels, intact and legible at time of use.

1.5 SCOPE

- A. Work Included: Work under this Section includes furnishing all labor, material, equipment and accessories necessary for completion of all painting and staining. Refer to paragraph 3.01 for list of items to receive paint.
- B. Work Not Included:
 - 01 Shop coat of paint on metal, unless noted otherwise. Refer to Section 05500 - Miscellaneous Metals.
 - 02 Aluminum and copper, unless otherwise noted.
 - 03 Factory finished equipment.

1.6 PRODUCT HANDLING

- A. Store only approved materials at the jobsite, storing only in a suitable and designated area restricted to the storage of paint materials and related equipment.
- B. Temperature in the storage area shall be between 40°F and 110°F. Open and mix all materials in the storage area.
- C. Use all means necessary to protect materials before, during, and after application, and to protect the installed work and materials of all other trades.
- D. Apply water-base paints only when temperature of surfaces to be painted, and surrounding air temperatures are between 50°F (10°C) and 90°F (32°C), unless otherwise permitted by paint manufacturer's printed instructions.
- E. Apply solvent-thinned paints only when temperature of surfaces to be painted, and surrounding air temperatures are between 45°F (7°C) and 95°F (35°C), unless otherwise permitted by paint manufacturer's printed instructions.
- F. Do not paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions. Painting may be continued during inclement weather, if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer, during application and drying periods.

1.7 EXTRA STOCK

- A. Upon completion of the work of this Section, deliver to the Owner, an extra stock equaling 10 percent or a minimum of 1 gallon, whichever is greater, of each color, type, and gloss of paint used in the work. Make sure each container is tightly sealed, clearly labeled with contents, and location where used.

1.8 WARRANTY

- A. The undertaking of a painting subcontract will indicate that the subcontractor will warrant the work specified herein for two years against becoming unserviceable or

1 causing an objectionable appearance, resulting from either defective or nonconforming
2 materials and workmanship.

3
4 B. Defects shall include by not be limited to the following:

- 5 01 Discoloring noticeably by yellowing, streaking, blooming, changing color or
6 darkening
7 02 Mildew
8 03 Peeling, cracking, blistering, alligating or releasing from the substrate
9 04 Chalking or dusting excessively
10 05 Changing sheen in irregular fashion
11 06 Softening or becoming tacky
12 07 Bubbling

13
14 C. In the event of damage, immediately make all repairs and replacements necessary for
15 approval of the Architect, and at no additional cost to the Owner.
16

17 **PART 2 - PRODUCTS**

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19 **2.1 MANUFACTURERS**

- 20
21 A. All paint materials selected for coating systems for each type of surface shall be the
22 product of a single manufacturer and shall, as a system, have flame spread, fuel
23 contribution, and smoke density test results less than 25.
24
25 B. Paint materials listed herein, unless otherwise designated in the "Painting Schedule", are
26 the products of Sherwin Williams, and require no further approval as to manufacturer or
27 catalogue number.
28
29 C. Sherwin Williams (NO SUBSTITUTIONS)

30
31 **2.2 MATERIALS**

- 32
33 A. The following is a specification of typical painted items and does not specifically include
34 every item that is to receive paint. It should, however, establish type and quality of finish
35 for all items normally included in a complete paint job.
36
37 B. Ferrous Metals:
38 01 1 coat – SW Pro-Cryl Universal Water Based Primer B66-310 Series. 2.0 – 4.0 mdf
39 02 2 coats – SW DTM Acrylic Gloss Coating B66W100 Series. 2.5 – 4.0 mdf each coat
40
41 C. Exterior Wood:
42 01 1 coat – SW A-100 Alkyd Wood Primer Y24W20. 2.3 mdf
43 02 2 coats – SW DTM Acrylic Semi Gloss Coating B66W100 Series. 2.5 – 4.0 mdf each
44 coat
45
46 D. Interior Gypsum Drywall and Ceilings – Enamel Finish:
47 01 1 coat – SW Preprite 200 Latex Primer B28W200. 1.1 mdf
48 02 2 coats – SW ProClassic Waterborne Acrylic S/G Enamel B31W51 Series. 1.4 mdf
49 each
50 03 coat
51
52 E. Interior Non-Galvanized Metal:
53 01 1 coat – SW ProCryl Water Based Universal Primer B66-310 Series. 2.0 – 4.0 mdf
54 02 2 coats – SW ProClassic Waterborne Acrylic S/G Enamel B31W51 Series. 1.4 mdf
55 each
56 03 coat

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- F. On Metal with Shop Coat, use:
 - 01 Touch-up Shop Coat with SW ProCryl Water Based Universal Primer B66-310 Series. 2.0 – 4.0 mdf
 - 02 2 coats – SW Pro Classic Interior Alkyd Semi Gloss B34 Series
 - 03 Used for metal doors and frames and miscellaneous metal items

- G. Interior CMU – Enamel Finish:
 - 01 2 coats - SW Loxon Block Surfacer A24W200. 8.0 mdf each coat
 - 02 2 coats – SW ProClassic Waterborne Acrylic S/G Enamel B31W51 Series. 1.4 mdf each coat

- K. Interior Wood - Enamel
 - 01 1 coat – SW Preprite Classic Latex Primer B28W101. 1.6.mdf.
 - 02 2 coats - SW ProClassic Waterborne Acrylic S/G Enamel B31W51 Series. 1.4 mdf each
 - 03 coat

- L. Interior Wood – Transparent Finish
 - 01 SW Wood Classics Stain A49-200 Series.
 - 02 1 coat SW Wood Classics Sanding Sealer B26V43. 1.2 mdf.
 - 03 2 coats SW Wood Classics Varnish A66 Series. 2.6 mdf each coat

- M. Cement Siding, Soffit and Trim (specification call pre – primed).
 - 01 Cement Siding, Soffit and Trim
 - 02 2 coats -SW ProClassic Waterborne Acrylic S/G Enamel B31 W51 Series. Follow the Manufactures recommendation for top coat.

2.3 COLORS

- A. Colors shall be as selected by Architect. Different colors may be selected for each room, and more than one color may be selected in each room.

PART 3 - EXECUTION

3.1 ITEMS TO RECEIVE PAINT

- A. Generally, all items that are normally painted in any typical building, including but not limited to the following list:
 - 01 All ferrous metal
 - 02 All exterior galvanized metal and all exterior metal wall panels.
 - 03 All Exterior Wood:
 - a. Uniformly coat (approximately 250 square feet per gallon) with Devoe velour alkyd semi-gloss.
 - b. Color:
 - 04 All interior wood
 - 05 All exposed conduit, outlet boxes and electrical cabinets, excluding those located in mechanical rooms.
 - 06 All new pipe, plumbing and ductwork, including those located in mechanical rooms.
 - 07 All new metal grilles, except aluminum, unless otherwise indicated.
 - 08 All new exposed gypsum board surfaces, including all mechanical rooms.
 - 09 All exposed exterior concrete masonry units, including all mechanical rooms.
 - 10 Miscellaneous other items which normally require painting or are scheduled to be painted.

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- 11 Consult plans, finish schedule, details and specifications for other trades as all items usually field painted or finish will be considered as part of the Contract.
- 12 All new exposed mechanical equipment and electrical equipment.
- 13 Mechanical Room Pipes: All pipes shall be painted if insulated or not insulated.

B. All work where a coat of material has been applied must be inspected and approved by the Architect, before application of succeeding specified coat, otherwise no credit for coat applied will be given. Notify Architect when a particular coat has been completed for inspection and approval. Apply coats of material in strict accordance with manufacturer's specifications, except where requirements of these specifications are in excess of manufacturer's requirements. Paint all sight exposed pipe and plumbing, only after all mechanical work and tests have been completed.

3.2 PREPARATION

A. General: Surface must be clean to ensure adhesion. Remove oil and grease with paint thinner. Wash off dirt with warm soapy water and rinse with clean water. Remove rust by wire brushing or sanding.

B. Unfinished Surfaces:

- 01 Wood: Sand smooth and apply one coat of primer undercoat. After primer has dried overnight, putty nail holes and cracks, then spot-prime putty with primer. Again, allow the primer to dry overnight, sand lightly and topcoat.
- 02 Masonry and Concrete: Remove efflorescence or cement dust on masonry and concrete by etching with a 10% solution or muriatic (Hydrochloric) acid. Flush off surface after etching with clean water, and paint while still damp. On surface where muriatic acid cannot be used to neutralize the efflorescence, remove the efflorescence by sanding, scraping or wire brushing, and apply a coat of masonry conditioner before painting. If efflorescence is not present, no primer is necessary on concrete and masonry surfaces. Fill voids and pores in concrete and haydite blocks with latex block filler and allow to dry overnight before topcoating.
- 03 Iron and Steel: Prime with metal primer and allow to dry overnight before topcoating.
- 04 Galvanized Metal: Prime with galvanized metal primer and allow to dry overnight before topcoating.

3.3 APPLICATION

A. General: Surfaces to be finished must be clean, dry, free of dirt, oils, loose paint or any other contamination that would adversely affect adhesion, protective properties or appearance of the coating.

B. Paint Thickness: Provide the following minimum dry film thickness per coat, unless noted otherwise:

- 01 Enamels on Metal: 1 mil
- 02 Latex Paints: 1 mil
- 03 Metal Primers: 1.5 mils
- 04 Undercoats: 1.5 mils
- 05 Oil Paints: 1.5 mils
- 06 Traffic Lines: 2.5 mils
- 07 Epoxy Coating: 2.0 mils

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Thickness Test: Use observation gauge that measures "V" shape scratch.

- C. Allow exterior paints to dry 72 hours between coats and interior paint to dry 24 hours between coats. Allow all enamels and varnishes to dry 24 hours between coats. If enamel and varnishes are tacky after 24 hours, allow additional time until finish is dry.
- D. Leveling: Apply with proper consistency and quality so paint flows out to a level surface free of brush and roller marks, bubbles, dust, runs, sags, and holidays. Spread evenly.
- E. Appearance: Uniform color, texture and sheen.
- F. Neatness: Paint shall not be smeared, spattered or run over adjoining colors or materials. Cut-on lines shall be straight.
- G. First coat shall be white, unless otherwise specified.

END OF SECTION

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SECTION 10 10 00

MISCELLANEOUS SPECIALTIES

CONDITIONS OF THE CONTRACT and DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Shop Drawings:
 - 01 Manufacturer's specifications and other data needed to prove compliance with specified requirements
 - 02 Manufacturer's installation instructions
 - 03 Samples of color charts showing manufacturer's full range of colors.

PART 2 - PRODUCTS

2.1 MATERIALS AND MANUFACTURERS

- A. Knob Box:
 - a. Series 3200 (No Substitutions)
 - b. Finish: Aluminum
 - c. Semi recessed at Masonry
 - d. Hinged Lid
 - e. Coordinate mounting location and height with Local Authority
- B. TV Bracket:
 - a. OmniMount, recessed in wall mount
 - b. Model: OC175T (or Equal)
 - c. Provide 1 ½" solid blocking at recess for fastening
 - d. Tilt motion for optimum viewing angles

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
- B. Adjust for proper operation.

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SECTION 10 14 00

GRAPHICS & CEILING CLOUDS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 -GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 WORK INCLUDED

- A. Furnish and install the following:
- 01 Resin wall display
 - 02 Symphony Ceiling Feature
 - 03 Room identification signs

1.3 QUALITY ASSURANCE

- A. Work of this Section shall comply with applicable requirements of the Handicapped Accessibility Act of Texas, as codified in Section 7, Article 601b, Vernon's Texas Civil Statutes.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Resin wall display system: (Ref: interior elevations at lobby and corridor 137, for size and quantity)
- 01 **3form Varia Ecoresin**, 3/8" x 48" x 119" panels, custom high-resolution graphic printed within panel, 1mm barrel mounts, 1" cap w/25mm threaded rod and universal anchoring kit.
- B. Resin Ceiling Clouds: (Ref: interior elevations at lobby ceiling plans and building sections, for form and quantity)
- 01 **3form Shapes Symphony, Cilantro G40, Flow A, Flow B, Valley** panels, Suspended from structure on threaded rod/Unistrut trapeze above finish ceiling. Ball socket mounting kits.
- C. Interior Signage
- 01 Signs shall be constructed of plastic laminate laminated to an acrylic core. Raised acrylic character and symbols to be chemically welded through the laminate to the acrylic core to assure permanent attachment. The grade 2 Braille shall be an integral part of the face color with paint fill the same color as the color laminate where it is located. Sizes, colors, letter and edging as shown on drawings and schedule.

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02 Signage schedule is included in the construction documents.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install per manufacturers written instruction, coordinate finish lumber mounts indication on the plans.
- B. Architect to provide design intent of custom graphic, final artwork and file formatting shall be furnished by signage supplier/fabricator.
- C. Install interior signage with perimeter of foam tapes and center fill of clear silicone adhesive, locate on wall at strike side of door, 4” from jamb, 5’ above the floor, unless otherwise shown. Mount with a solid back-up plate of same color to cover reverse side on glass.

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SECTION 10 26 13

CORNER GUARDS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.
- B. This section includes the furnishing and installation of stainless steel corner guards at all painted outside corners of drywall partitions.

1.2 SUBMITTALS

- A. Data for each product.
- B. Shop drawings indicating mounting details and fasteners.
- C. Sample - 18 inches long minimum

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Corner guards shall be stainless steel, type 304 with #4 satin finish
- B. Size: 1" x 1"
Material Thickness: 16ga minimum
Shape: 90 degrees, secured with adhesive
Height: 96"
- C. Attach manufacturer approved adhesive

2.2 MANUFACTURERS

- A. C-S Group "Acrovyn CO-8 Series"
- B. Pawling Corp.
- C. ASI
- D. Or Equal

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Locate corner guards outside corners of corridors and restrooms, for appropriate substrate, and in compliance with the manufacturer's instructions. Install corner guards and wall guards level and plumb at the height indicated on the drawings, with surfaces free from distortion or other defects in appearance.
- B. Cleaning: At completion of the installation, clean surfaces in accordance with manufacturer's instructions.

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SECTION 10 28 13

TOILET ROOM ACCESSORIES

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SCOPE:

- A. Furnish and install items specified.

1.3 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Shop Drawings: Indicate size, material and finish. Show locations, installation procedures. Include details of joints, attachments, fasteners, clearances, and mounting heights.
- C. Product Data: Submit manufacturer's technical data and installation instructions.
- D. Operation and Maintenance Instructions:
 - 01 Provide printed or written instructions for operation and maintenance of units specified.

1.4 MINIMUM COMPLIANCE STANDARDS

- A. Comply with ANSI A117.1

PART 2 - PRODUCTS

2.1 QUALITY STANDARDS

- A. Design, finish and keying of items shall be the same.
- B. Furnish items from one manufacturer only, unless otherwise specified or directed by Architect.

2.2 MATERIALS

- A. Stainless Steel:
 - 01 Alloy: AISI, Type 302 or 304 (18-08) ASTM A167
 - 02 Finish: No. 4 satin, unless otherwise specified
 - 03 Thickness: US Stainless 22 gauge minimum
- B. Aluminum:
 - 01 Extruded: 6463-T5 alloy, anodized

- 1 02 Cast: 356 or 356-T6 alloy
- 2
- 3 C. Chromium Plating:
- 4 01 Method: Over nickel
- 5 02 Standard: ASTM C456, Type SC 2
- 6
- 7 D. Brass:
- 8 01 Cast or forged
- 9 02 QQ-B-626C
- 10
- 11 E. Mirrors: (Framed)
- 12 01 Standard: Federal Standard A-A-3002.
- 13 02 Glass thickness: 1/4-inch minimum
- 14 03 Backing: Electrolytic cooper
- 15 04 Protection: Padding and filler strips
- 16 05 Frame: Type 304 stainless steel, satin finish.

17

18 **2.3 MANUFACTURERS**

- 19
- 20 A. Bobrick Dispensers, Inc.
- 21 B. Bradley Washfountain Co.
- 22 C. American Specialties (Basis of Design)
- 23 D. Or Equal

24 **PART 3 - EXECUTION**

25

26 **3.1 MOUNTING LOCATIONS**

- 27
- 28 A. Refer to drawings for mounting locations. When not shown, submit supplier's
- 29 recommendations for locations and mounting height before proceeding.
- 30
- 31 B. Contractor shall be responsible for supplying all opening, blocking, and other
- 32 components necessary for installation of all toilet accessories.
- 33
- 34 C. Use approved theft-resistant type fasteners.
- 35
- 36 D. Comply with ADA requirements. Refer to the drawings.

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38 **PART 4 - SCHEDULES**

39

40 **4.1 ITEM LIST**

- 41
- 42 A. As a quality standard, model numbers shown are ASI Products.
- 43 Washroom Equipment:
- 44 01 TA-1 - Soap Dispensers
- 45 a. Model No.: 20333
- 46 b. Mounting: Deck Mount with concealed fasteners.
- 47 c. Soap: Liquid
- 48 02 TA-2 - Mirrors
- 49 a. Model No.: Series 0620 series stainless steel framed mirror without
- 50 shelf.
- 51 b. Mounting: Surface with concealed fasteners
- 52 c. Sizes: Refer to drawings.
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- 03 TA-3 – Paper Towel Dispenser
 - a. Model No.: enMotion 59466, Automatic paper towel dispenser, stainless steel.
 - b. Mounting: Semi-recessed with concealed fasteners
- 04 TA-4 – Waste Receptacle
 - a. Model No.: 0458 12 Gallon
 - b. Mounting: Semi recessed with concealed fasteners
- 05 TA-5 - Toilet Paper Dispenser
 - a. Model No.: 0264 dual roll stainless steel dispenser.
 - b. Mounting: Surface with concealed fasteners
 - c. Location: One at each toilet, whether indicated or not.
- 06 TA-6 - Grab Bars – Toilet Compartments
 - a. Model No 3800 x 36 and x 42 in each 60” wide accessible stall
 - b. Model No.: 3800 x 42 (2) in each 36” wide accessible stall
 - c. Mounting: Surface with concealed fasteners and theft-proof covers
- 07 TA-7 - Mop and Broom Holder
 - a. Model No.: 8215-4, four holders
 - b. Mounting: Surface
 - c. Location: One at each mop sink, whether indicated or not.
- 08 TA-8 - Clothes Hooks
 - a. Model: 738-S
 - b. Mounting: Surface (48” AFF)
 - c. Location: One at each toilet stall door, whether indicated or not.

END OF SECTION

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SECTION 10 44 00

FIRE EXTINGUISHER AND CABINETS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Instructions to Proposers for substitutions.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's specifications and installation instructions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Cabinets:
01 Larsen's Manufacturing Co.
02 J. L. Industries - "Cosmopolitan" Series #1037-V10
- B. Fire Extinguisher:
01 Larsen's Manufacturing Co.
02 J. L. Industries

2.2 MATERIALS

- A. Fire Extinguisher Cabinets: (SRFE noted on Plans)
01 24" x 9 1/2" x 6" inside box dimension
02 Semi-recessed type with 2 1/2 inch return trim rolled edge
03 Stainless steel door with handle and silk-screened lettering "Fire Extinguisher" with wire glass.
04 Hinge: Concealed
05 Provide a handle and roller catch.
06 Finish of Exterior: Stainless steel
07 Finish of Interior: Standard
08 All fire extinguisher cabinets shall be furnished with 10 lb. fire extinguisher.
- B. Fire Extinguishers (Standard):
01 Multi-purpose dry chemical with UL 4A-60B:C and FM approved; UL 2A-10B:C for 5 lbs, Cosmic (A,B,C class)
02 **Class K wet chemical with UL 1-A:K, Saturn 15 1.8 gallon with stainless steel cylinder required at Kitchen/Breakroom.**
02 Capacity: 5 lb. At mechanical rooms and direct wall mounted extinguishers; and 10 lb. at fire extinguisher cabinets as shown on drawings.
03 Extinguishers are furnished for direct wall mounting and for fire extinguisher cabinets. Refer to drawings for location and quantity.
04 Provide initial inspection tag for each extinguisher.
- C. Surface Mounted
01 Same as above with brackets etc. (Use in Mech. Rooms).

PART 3 - EXECUTION

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3.1 INSTALLATION

- A. Install in openings prepared by others in accordance with manufacturer's printed instructions.

END OF SECTION

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SECTION 10 73 16

ALUMINUM CANOPY / WALKWAY COVER

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Trellis Tubes, aluminum square tube members, at front and side elevations.

1.2 ENGINEERING

- A. All trellis tubes shall be engineered to meet minimum wind load criterion established for this project.
- B. Design of tube connections to Glulam beams shall be included. Coordinate with the Contractor for installation responsibility.

1.3 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Shop Drawings: Indicate size, material and finish. Show location and installation procedures. Include details of joints, attachments and clearances.
- C. Product Data: Manufacturer's specification and technical data, and installation instructions.
- D. Samples or color charts showing manufacturers full range of colors, standard and custom colors.
- E. All shop drawings and other submittals as required shall be sealed, signed and dated by a structural engineer licensed in the state of Texas.

1.4 REFERENCE STANDARDS

- A. Factory Mutual: 1-90 Wind Uplift. Refer to other sections for additional information on wind load requirements.
- B. Underwriters Laboratories: Class A Fire Rating
- C. Aluminum Association: AA-MIO-C22-A21

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum extrusions shall be 6063-6 temper.
- B. Provide 2" x 8" aluminum trellis tubs shown on drawings.
- C. Structure shall be designed by the manufacturer to withstand heavy hail, and hurricane winds, in the configurations as shown on drawings.
- D. Expansion Joints: Provide expansion joints as required. Expansion joints shall have no metal-to-metal contact.

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2.2 MANUFACTURERS

- A. The following manufacturers have been pre-approved to provide work of this section; subject to meeting or exceeding all specified requirements.
 - 01 AAPCO Protective Covers
 - 02 ASA Builders
 - 03 American Aluminum Industries, Inc.
 - 04 American Walkway Covers, LLC
 - 05 Atlas Custom Metals
 - 06 Avadek Walkway Cover Systems and Canopies
 - 07 Dittmer Architectural Aluminum
 - 08 E. L. Burns Co.
 - 09 Mapes Architectural Products
 - 10 Peachtree Protective Covers
 - 11 Perfection Metal Supply
 - 12 "Span Deck" Architectural Metal Systems
 - 13 Superior Metal Products Co.
 - 14 Texas Aluminum Industries, Inc.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install at locations shown on the drawings.
- B. Follow manufacturer's printed instructions.
- C. Coordinate dimensional requirements prior to fabrication.

3.2 ERECTION

- A. Erection shall be in accordance with manufacturer's recommendations.
 - 01 Erectors shall be manufacturer approved.
- B. Erect after all structural concrete and masonry in vicinity is complete and washed down.
- C. Column sleeves shall be furnished by the manufacturer and installed by the General Contractor, to elevations and dimensions on approved shop drawings.
- D. Erect all bents straight and true. Protect columns with heavy plastic sheeting.
- E. Downspout columns shall be filled with grout to the discharge level to prevent standing water. Downspout deflectors shall be installed after grouting.
- F. Install all flashing required at the juncture of deck sections.

3.3 CLEANING AND PROTECTION

- A. Care shall be taken to prevent damage or scratching. Damaged or scratched components will not be accepted.

END OF SECTION

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SECTION 10352

ALUMINUM FLAGPOLES

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 SUBSTITUTIONS

A. Refer to Instructions to Proposal for substitutions.

1.2 SUBMITTALS

- A. Comply with Section 01 33 00
- B. Manufacturer's printed specifications and installation instructions.
- C. Shop Drawings: Show general layout, dimensions, base details, anchorage, finishes and components of system.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Tapered Aluminum Flagpole (**25' and 30' RE: Elevations noted on plans**)
 - 01 Provide all standard fittings for a complete installation.
 - 02 Standard type 25'-0" and 30'-0" exposed height above ground.
 - 03 Outside butt diameter: 5 inches
 - 04 Outside top diameter: 3 inches
 - 05 Wall thickness: .1250 inches minimum
 - 06 6063 - T6 seamless cold-drawn aluminum body, escutcheons, and fittings
 - 07 Pole surface 80 grit clear anodized satin finish
 - 08 Metal base is not required
 - 09 6" dia. ball/gold anodized aluminum
 - 10 Clear anodized aluminum, clear cover with cylinder lock.
 - 11 Halyards: Nylon with metal core
 - 12 Flags: By Owner

2.2 MANUFACTURERS

- A. Acme Flagpole Company
- B. American Flagpole
- C. Baartol Company, Inc.
- D. Babcock - Davis Associates, Inc.
- E. Concord Industries
- F. Metal Arts
- G. Morgan-Francis Co.
- H. Texas Flagpole Company

1 **PART 3 - EXECUTION**

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3.1 **INSTALLATION**

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A. Install in location shown on the drawing in accordance with manufacturer's instruction and approved shop drawing.

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B. Provide positive lightning ground.

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C. Check and adjust installation fittings for smooth operation before acceptance.

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END OF SECTION

SECTION 12 21 24

ROLLER SHADES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Provide manually operated, roller shades at window in rooms 108-114, window Q in rooms 138 & 140
- B. Provide electronically operated, Electro shades at windows in rooms 118, 119, 134, & 136.
- C. See Alternate 6 for additional scope and locations.

1.2 SUBMITTALS

- A. Bid Submittal, Information Required with Submittal of Bid: In order to evaluate proposals for integrated lighting or AV control and window shade systems, the Architect requires the following information be submitted prior to the award of the system.
 - 1. Bid proposal shall be accompanied with a document that notes all deviations from these specifications on a line-by-line basis.
 - 2. Bid shall confirm that roller shade EDU's and all related controls shall be integrated into a compatible control system as specified herein.
 - 3. Bid shall include separate line items listing the control/interface components required for building automation systems and building management systems (BAS/BMS), daylighting, audiovisual, and/or central integration systems. Roller shade controls manufacturer shall list all components included in their bid and shall include a letter stating that they shall be financially responsible for any change orders and/or back charges required by the BAS/BMS, audiovisual, or lighting control systems contractors to interface with the motorized roller shade system.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
 - 3. Storage and handling requirements and recommendations.
 - 4. Mounting details and installation methods.
 - 5. Typical wiring diagrams including integration of EDU controllers with building management system, audiovisual and lighting control systems as applicable.
- C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, power and control wiring diagrams, and relationship to adjacent work.
 - 1. Prepare shop drawings on AutoCAD or Microstation format using base sheets provided electronically by the Architect.
 - 2. Prepare control, wiring diagrams based on, switching and operational requirements provided by the Architect in electronic format.
 - 3. Include one-line diagrams, wire counts, coverage patterns, and physical dimensions of each item.
- D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- E. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shade cloth samples and aluminum finish sample as selected. Mark face of material to indicate interior faces.
- F. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.
- G. Warranty: Provide manufacturer's warranty documents as specified in this Section.

1.3 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** Obtain roller shades system through one source from a single manufacturer with a minimum of ten years experience and minimum of five projects of similar scope and size in manufacturing products comparable to those specified in this section. This includes but is not limited to all required extrusions, accessories, controls and fabricated roller shades or else all stated and published warranties may be void.
- B. **Installer Qualifications:** Engage an installer, which shall assume responsibility for installation of all system components, with the following qualifications.
 - 1. Installer for roller shade system shall be trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.
- C. **Fire-Test-Response Characteristics:** Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- D. **Electrical Components:** NFPA Article 100 listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing. Where applicable, system components shall be FCC compliant.
- E. **Shadecloth Anti-Microbial Characteristics:** ‘No Growth’ per ASTM G 21 results for fungi
- F. **PVC-Free Shadecloth:** Comply with the following.
 - 1. **Environmental Certification:** Submit written certification from the manufacturer, including third party evaluation, recycling characteristics, and perpetual use certification as specified below. Initial submittals, which do not include the Environmental Certification, below will be rejected. Materials that are simply ‘PVC free’ without identifying their inputs shall not qualify as meeting the intent of this specification and shall be rejected.
 - 2. **Third Party Evaluation:** Provide documentation stating the shade cloth has undergone third party evaluation for all chemical inputs, down to a scale of 100 parts per million, that have been evaluated for human and environmental safety. Identify any and all inputs, which are known to be carcinogenic, mutagenic, teratogenic, reproductively toxic, or endocrine disrupting. Also identify items that are toxic to aquatic systems, contain heavy metals, or organohalogens. The material shall contain no inputs that are known problems to human or environmental health per the above major criteria, except for an input that is required to meet local fire codes.
 - 3. **Recycling Characteristics:** Provide documentation that the shade cloth can, and is part of a closed loop of perpetual use and not be required to be down cycled, incinerated or otherwise thrown away. Scrap material can be sent back to the mill for reprocessing and recycling into the same quality yarn and woven into new material, without down cycling. Certify that this process is currently underway and will be utilized for this project.
 - 4. **Perpetual Use Certification:** Certify that at the end of the useful life of the shade cloth, that the material can be sent back to the manufacturer for recapture as part of a closed loop of perpetual use and that the material can and will be reconstituted into new yarn, for weaving into new shade cloth. Provide information on each shade band indicating that the shade band can be sent back to the manufacturer for this purpose.
- G. **Mock-Up:** Provide a mock-up, if Architect requires, of one roller shade assembly for evaluation of mounting, appearance and accessories.
 - 1. Locate mock-up in window designated by Architect.
 - 2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Power and control wiring shall be complete and certified, fully operational with uninterrupted communication on the lines and minimal noise certified by a commissioning agent (engaged by others).
 - 1. 485, ICON, Lonmark and Dry Contract Network: Noise on the line not to exceed shade manufacturer's limits.

1.6 WARRANTY

- A. Warranty: Provide manufacturer's standard warranties, including the following:
 - 1. Roller Shade Hardware, and Shadecloth: Manufacturer's standard non-depreciating twenty-five year limited warranty.
 - a. EcoVeil standard non-depreciating 10-year limited warranty.
 - 2. Electronic Roller Shade EDU's and EDU Control Systems: Manufacturer's standard non-depreciating five-year warranty.
 - 3. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to access to the work above 12' Feet AFF, which are the responsibility of others.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design Manufacturer for Window Shade System: Products by MechoSystems; 42-03 35th Street, Long Island City, NY 11101. Tel: (718) 729-2020 ext 1901; Mr. Glen Berman. Email: glenb@MechoSystems.com.

2.2 SHADE BANDS

- A. Shade Bands: Construction of shade band includes the fabric, the enclosed hem weight, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
 - 1. Concealed Hembar: Shall be continuous extruded aluminum for entire width of shade band and with the following characteristics:
 - a. Hembar shall be heat sealed on all sides.
 - b. Open ends shall not be accepted.
 - 2. Shade Band and Shade Roller Attachment:
 - a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection.
 - b. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
 - c. Mounting Spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
 - d. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets, does not meet the performance requirements of this specification and shall not be accepted.

2.3 ROLLER SHADE FABRICATION

- A. Fabricate shade cloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design.

- B. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shade bands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shade cloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.
- C. For railroaded shade bands, provide seams in railroaded multi-width shade bands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, assure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shade bands
- D. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shade bands.
- E. Blackout shade bands, when used in side channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 3 feet (115 mm) on center extending fully into the side channels. Battens shall be concealed in an integrally colored fabric to match the inside and outside colors of the shade band, in accordance with manufacturer's published standards for spacing and requirements.
 - 1. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.

2.4 ROLLER SHADE COMPONENTS

- A. Access and Material Requirements:
 - 1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
 - 2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
 - 3. Use only Delran engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester shall not be accepted.
- B. Manual Operated Chain Drive Hardware and Brackets:
 - 1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
 - 2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
 - 3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
 - 4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer's design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.
 - 5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.
 - 6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable.
 - 7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
 - 8. Drive Bracket / Brake Assembly:
 - a. MechoShade Drive Bracket model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, room darkening side / sill channels, center supports and connectors for multi-banded shades.
 - b. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.

- c. The brake shall be an over running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
 - d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
 - e. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
9. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

2.5 ROLLER SHADE SCHEDULE

- A. Roller Shade Schedule:
 - 1. Shade Type WT-1: Manual operating, chain drive, sunscreen roller shades at windows in rooms 108-114.
 - a. Shade pockets.
 - b. Fascias.
 - 2. Shade Type WT-2: Electronically operating, chain drive, sunscreen roller shades at windows in rooms 118, 119, 134, & 136.
 - a. Shade pockets.
 - b. Fascias.

2.6 SHADECLOTH

- A. Visually Transparent Single-Fabric Shadecloth: MechoSystems, ThermoVeil® group, single thickness, opaque non-raveling 0.030-inch (0.762 mm) thick vinyl fabric, woven from 0.018-inch (0.457 mm) diameter extruded vinyl yarn comprising of 21 percent polyester and 79 percent reinforced vinyl, in colors selected from manufacturer's available range.
 - 1. Open Basket Weave: "2100 series", 8 percent open, 2 by 2 open basket-weave pattern. VLT_range 12 to 18 percent.
 - 2. Color: Selected from manufacturer's standard colors.

2.7 ROLLER SHADE ACCESSORIES

- A. Fascia:
 - 1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
 - 2. Fascia shall be able to be installed across two or more shade bands in one piece.
 - 3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
 - 4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.
- B. Room Darkening Side and Sill Channels:
 - 1. Extruded aluminum with polybond edge seals and SnapLoc-mounting brackets and with concealed fastening. Exposed fastening is not acceptable. Channels shall accept one-piece exposed blackout hembar with vinyl seal to assure side light control and sill light control.
 - a. MechoSystems side channels, 1-15/16 inches (49.2 mm) wide by 1-3/16 inches (30.1 mm) deep, two-band center channels, 2-5/8 inches (66.6 mm) wide by 1-3/16 inches (30.1 mm) deep. The 2-5/8-inch (66.6 mm) double-center channels may be installed at center-support positions of multi-band-shade ElectroShades. MechoSystems side

- channels 2-5/8 inch (66.6 mm) may be used as center supports for ElectroShades; shade bands up to 8 high. For shade bands over 8 feet (2438 mm), provide ElectroShade side channels.
- b. ElectroShade side channels, 2-1/2 inches (63.5 mm) wide by 1-3/16 inches (30.1 mm) deep; two-band center channels 5 inches (127 mm) wide by 1-3/16 inches (30.1 mm) deep. The 2-5/8-inch (66.6 mm) double-center channels may be installed at center-support positions of multi-band-shade ElectroShades. MechoSystems side channels 2-5/8 inches (66.6 mm) may be used as center supports for ElectroShades. Also provide for use with manually operated room darkening MechoSystems's over 8 feet (2438 mm) in height.
 - c. Color: Selected from manufacturer's standard colors or custom color as selected by Architect.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

- 3.3 Turn-Key Single-Source Responsibility for Interior Roller Shades: To control the responsibility for performance of the electric roller shade system; assign the design, engineering, and installation of electronic drive roller shade control system, shades, addressable controls, communication interfaces, and any required sensors, switches and low voltage control wiring specified in this Section to the manufacturer of the shade and control system. The Architect will not produce a set of electrical drawings for the installation of control wiring for the electric roller shade control system.

- A. General Contractor Responsibilities:
 1. Provide power panels and circuits of sufficient size to accommodate roller shade manufacturer's requirements, as indicated on the mechanical and electrical drawings and manufacturer's shop drawings.
 2. Coordinate with requirements of subcontractor for this section before inaccessible areas are constructed.
 3. Coordinate requirements of ALSCS before inaccessible areas are constructed.
 4. Provide conduit with pull wire in all areas, which might not be accessible to ALSCS due to building design, equipment location or schedule:
 5. Coordinate with the main building electrical subcontractor to provide duplex 120 VAC power receptacle in Electric closet for floor/riser Communication Gateways.
 6. Verify that wiring conditions, which have been previously installed under other sections or at a previous time, are acceptable for product installation in accordance with manufacturer's instructions.
 7. Comply with manufacturer's product data, including shop drawings, technical bulletins, product catalog installation instructions, and product carton instructions for installation.
 8. Protect installed product and finished surfaces from damage during all phases of installation including preparation, testing, and cleanup.
 9. Be responsible for all other required electrical work including but not limited to roof penetrations, conduits, fireproofing, etc.
 10. Provide conduit with pull wire in all areas, which might not be accessible to subcontractor due to building design, equipment location or schedule.
- B. Window Covering Subcontractor (WC) Responsibilities:
 1. Shade Control Subcontractor shall furnish and install shade controllers, interfaces, splitters, coupler, sensors, switches, junction boxes, etc mounted in the ceiling in an accessible location. Locations for all visible devices to be coordinated with Architect. The

shade control subcontractor shall inspect all material included in this contract prior to installation. Manufacturer shall be notified of unacceptable material prior to installation.

2. Line Voltage Wiring:
 - a. WC to ROLLER SHADE EDU: The WC shall furnish and install power connection between Shade control system and EDU, and shall be capable of providing single line voltage wire pull for each EDU.

3.4 INSTALLATION OF ROLLER SHADES

- A. Contractor Furnish and Install Responsibilities:
 1. Window Covering Contractor (WC) shall provide an on site, Project Manager, and shall be present for all related jobsite scheduling meetings.
 2. WC shall supervise the roller shade installation, and setting of intermediate stops of all shades to assure the alignment of the shade bands within a single EDU group, which shall not exceed +/- 0.125 inches (3.175mm), and to assure the alignment between EDU groups, which shall not exceed +/- 0.25 inches (6.35mm).
 3. WC shall be responsible for field inspection on an area-by- area and floor-by-floor basis during construction to confirm proper mounting conditions per approved shop drawings.
 4. Verification of Conditions: examine the areas to receive the work and the conditions under which the work would be performed and notify General Contractor and Owner of conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected. Commencement of installation shall constitute acceptance of substrate conditions by the installer.
 5. WC shall provide accurate to 0.0625 inch (1.5875mm); field measurements for custom shade fabrication on the Roller Shades manufacturers input forms.
 6. WC Installer shall install roller shades level, plumb, square, and true according to manufacturer's written instructions, and as specified here in. Blocking for roller shades installed under the contract of the interior General Contractor shall be installed plumb, level, and fitted to window mullion as per interior architect's design documents and in accordance with industry standard tolerances. The horizontal surface of the shade pocket shall not be out-of-level more than 0.625 inch (15.875mm) over 20 linear feet (6.096 meters)
 7. Shades shall be located so the shade band is not closer than 2 inches (50 mm) to the interior face of the glass. Allow proper clearances for window operation hardware.
 8. Adjust, align and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
 9. Installer shall set Upper, Lower and up to 3 intermediate stop positions of all motorized shade bands, and assure alignment in accordance with the above requirements.
 10. WC shall certify the operation of all motorized shades and turn over each floor for preliminary acceptance.
 11. The WC shall participate and cooperate with the electrical contractor, the window shade manufacturer and the Commissioning agent to verify and certify the installation is in full conformance with the specifications and is fully operational. This work to occur during the commissioning stage and is in addition to preliminary acceptance required for each floor.
 12. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
 13. WC shall train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.
 14. Protect installed products until completion of project.
 15. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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SECTION 12 36 40

SOLID SURFACING / COUNTERTOPS

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Quartz Countertops, backsplash, endsplash as shown on the drawings.
- B. Refer to Instructions to Bidders for substitutions.

1.2 SCOPE

- A. Work Included:
 - 01 Quartz Countertops
 - 02 Quartz Backsplash
 - 03 Quartz Endsplash
- B. Work Specified Elsewhere:
 - 01 Service fixtures and plumbing connections - Division 15
 - 02 Coordinate fixture locations with Architectural

1.3 SUBMITTALS

- A. Manufacturer's specifications and other data for all products proposed to be furnished as needed to prove compliance with specified requirements.
- B. Shop Drawings: Indicate size, material and finish. Show locations and installation procedures, including other pertinent data necessary for compliance.
 - 01 Field verified dimensions.
 - 02 Quartz surfacing dimensions
 - 03 Locations and dimensions of cutouts
 - 04 Required locations of support and blocking members
 - 05 Edge details-profiles
- C. Samples:
 - 01 Submit Quartz samples of the full range of colors, patterns, textures and finishes from the manufacturer's standard colors, for Architect's selections.
 - 02 Submit samples of edge details to be used.
- D. Maintenance Instructions: Provide manufacturer's maintenance and care instructions for the Quartz.

1.4 WARRANTY

- A. Warranty the work specified herein for ten year against becoming unserviceable or causing an objectionable appearance, resulting from either defective or nonconforming materials and workmanship.

- B. Defects shall include, but not be limited to the following:
 - 01 Delimitation of surfaces.
 - 02 Loose or missing parts.
 - 03 Noticeable deterioration of finish.
 - 04 Warped or misaligned surfaces or telegraphing of subsurface imperfections

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the requirements, provide the following product:
 - 1. Zodiac® quartz surfaces from DuPont
 - 2. Prestige Stone (basis of design).
 - 3. or Equal

2.2 MATERIALS

RETAIN BELOW FOR PERFORMANCE SPECIFICATION

- A. Material:
 - 1. Homogeneous quartz surfaces material.
 - 2. Material shall have minimum physical and performance properties specified.
- B. Thickness:
 - 1. 3 cm (1 1/8").
- C. Edge treatment:
 - 1. Eased Edge
- D. Seam width:
 - 1. <1/8" unless otherwise specified.
- E. Sink mounting:
 - 1. Undermount.
- F. Backsplash:
 - 1. Applied.
- G. Endsplash:
 - 1. Applied.

H. Performance characteristics: Zodiac® physical properties data sheet:

Property	Typical Result	Test Procedure
Flexural Strength	>5,300 psi	ASTM D 790
Flexural Modulus	5.3–5.7E ⁶ psi	ASTM D 790
Flexural Elongation	>0.1%	ASTM D 790
Compression Strength (Dry)	~27,000 psi	ASTM C 170
Compression Strength (Wet)	~24,000 psi	ASTM C 170
Hardness	7	Mohs' Hardness Scale
Thermal Expansion	1.45 x 10 ⁻⁵ in./in./°C	ASTM D 696
Gloss (60° Gardner)	45–50	ANSI Z 124
Colorfastness	Passes	ANSI Z 124.6.5.1
Wear and Cleanability	Passes	ANSI Z 124.6.5.3
Stain Resistance	Passes	ANSI Z 124.6

1 **2.3 ACCESSORY PRODUCTS**

2 A. Joint adhesive:

- 3 1. DuPont-approved adhesive to create color-matched seam.

4
5 RETAIN BELOW FOR UNDERMOUNT SINKS AND BOWLS

6
7 B. Sink/bowl mounting hardware:

- 8 1. Manufacturer's approved bowl clips, brass inserts and fasteners for attachment of
9 undermount sinks/bowls.

10
11 **2.4 FACTORY FABRICATION**

12 A. Shop assembly

- 13 1. Fabricate components to greatest extent practical to sizes and shapes indicated, in
14 accordance with approved shop drawings and manufacturer's printed instructions and
15 technical bulletins.
16 2. Form joints between components using manufacturer's standard joint adhesive joints.
17 a. Reinforce as required.
18 3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the
19 drawings.
20 4. Rout and finish component edges with clean, sharp returns.
21 a. Rout cutouts, radii and contours to template.
22 b. Smooth edges.

23 **2.5 FINISHES**

24 A. Select from the manufacturer's standard color chart.

25 1. Color:

- 26 a.SS-1 Windy Storm PS603 (Prestige Stone)
27 b.SS-2 Brulee PS604 (Prestige Stone)

28
29 **PART 3 — EXECUTION**

30
31 **3.1 INSTALLATION**

32 A. Install components plumb and level, in accordance with approved shop drawings and product
33 installation details.

34 1. Tops:

- 35 a. Flat and true to within 1/8" (3 mm) of a flat surface over a 10' length.
36 b. Allow a minimum of 1/16" to a maximum of 1/8" (3 mm) clearance between
37 surface and each wall.

38 B. Form field joints using manufacturer's recommended adhesive, with joint widths no greater than
39 1/8" (3 mm) in finished work.

- 40 1. Keep components and hands clean when making joints.

41
42 C. Sinks:

- 43 1. Adhere undermount sinks/bowls to countertops using manufacturer's recommended
44 adhesive and mounting hardware.
45 2. Adhere drop-in sinks/bowls to countertops using manufacturer-recommended
46 adhesives and color-matched silicone sealant.

47 D. Provide backsplashes and endsplashes as indicated on the drawings.

- 48 1. Adhere to countertops using manufacturer's standard color-matched silicone sealant.

49 E. Keep components and hands clean during installation.

- 50 1. Remove adhesives, sealants and other stains.
51 2. Components shall be clean on date of substantial completion.

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3.2 CLEANING AND PROTECTION

- A. Keep components clean during installation.
 - 1. Remove adhesives, sealants and other stains.
- B. Protect surfaces from damage until date of substantial completion.
 - 1. Replace damaged work.

END OF SECTION

1 SECTION 28 00 00

2
3 ACCESS CONTROLS

4
5 CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

6
7
8 PART 1 – GENERAL

9
10 1.1 **Manufacturer**

11 A. The manufacturer shall have at least thirty-five (35) years of experience in the role of fire and
12 security control manufacturing, and a proven track record of forward and backward compatibility
13 for a minimum of twenty (25) years for its product’s auxiliary devices, including system keypads,
14 annunciation devices, zone expansion modules, and addressable detection devices.

15 B. The manufacturer must also manufacture receiving equipment that is compatible with standard
16 dial-up telephone lines, network, and cellular network monitoring equipment that is compatible
17 with a LAN, WAN, and the Internet. The receiving equipment shall be capable of receiving all
18 status and alarm messages generated by the system. The receiving equipment shall be capable of
19 updating the panel operating program and the system date and time.

20 C. Commercial/Residential Intrusion detection/Access control /Household Fire Alarm Control Panel
21 equipment manufacturer shall be:

22 Digital Monitoring Products, Incorporated (DMP)
23 2500 N. Partnership Boulevard, Springfield, MO 65803
24 Telephone (417) 831-9362 FAX (417) 831-1325

25 1.2 **INSTALLER**

26 A. The installing company shall show proof of having regular experience with design, installation,
27 service, and maintenance of manufactured systems for a minimum of the last twelve (12) calendar
28 months from the project start date. Each system installer and service person must provide
29 manufacturer certification of technical training for installation, service, and system maintenance.
30 Certification shall be proven with an official document issued by the manufacturer.

31 B. The installing company shall provide a minimum of 8 (eight) verifiable references from its clients
32 where the manufacturer’s system has been installed within the last twelve (12) calendar months
33 from the project start date.

34 C. The installing company shall furnish and install a complete electrically supervised DMP panel, as
35 detailed in this specification. The system shall be inclusive of all necessary function, monitoring,
36 and control capability as detailed herein and on accompanying shop drawings.

37 E. The installing company shall become familiar with all details of the work, verify all dimensions in
38 the field, and shall advise the Architect of any discrepancy before performing the work. Materials
39 shall be installed in strict compliance with local building codes. All work shall be performed in
40 accordance with Digital Monitoring Products, Inc. instructions. Components must be installed and
41 serviced by a dealer in good standing that is factory-trained by Digital Monitoring Products.

42
43 1.2 **CENTRAL REPORTING STATION**

44 A. The central reporting station contractor must possess an Underwriter’s Laboratory (UL) listing
45 as a “Mercantile Police Station” or “Mercantile Burglar Alarm Systems” company. A copy of the
46 listing shall be attached as a part of this bid package.

47 B. The actual alarm signal receipt and processing is a significant portion of the scope of work. Third
48 party and/or contract stations are permitted. UL must list the monitoring station for Protective

1 Signaling Services or Central Reporting Station Signaling Services. A copy of the station UL listing
2 shall be attached as part of this bid package.

3 C. The monitoring station must provide openings/closing activity reports, activity day and time,
4 authorized individual, office name and account number and the system type being monitored.
5 These reports are to be mailed to the user's office at the end of each month. The Office Manager
6 or Contract Administrator may request an additional report if an incident occurs.

7 D. The contractor must have a valid Alarm Operator License. A copy of licenses shall be attached as
8 part of this bid package.

9 E. The contractor may be required to monitor a portion of the alarm systems by way of the end
10 user data network.

11 F. The contractor shall become familiar with all work details, verify all dimensions in the field, and
12 shall advise the Architect of any discrepancy before performing the work.

13 G. The end user shall not incur any central station setup charges by the contractor to receive alarm
14 signals by way of the end user data network.

15 16 **2.0 SCOPE**

17 18 **2.1 REQUIREMENTS**

19 A. Furnish and install a complete Intrusion Detection/Access Control system or Fire Alarm Control
20 Panel (FACP) with the performance criteria detailed in this specification. The system shall be
21 inclusive of all necessary functions, monitoring, and control capability as detailed herein and on
22 accompanying Shop drawings.

- 23 01 On-site or remote video monitoring
- 24 02 Heating, air conditioning, and lighting management
- 25 03 Temperature threshold detection and monitoring
- 26 04 Humidity threshold detection and monitoring
- 27 05 Pressure threshold detection and monitoring
- 28 06 Power loss detection and monitoring, generator switching
- 29 07 Leak detection and monitoring
- 30 08 Carbon Monoxide detection and monitoring
- 31 09 Tank level threshold detection and monitoring

32 B. This specification document provides the requirements for the installation, programming, and
33 configuration of a complete DMP panel. This system shall include, but not be limited to:

- 34 01 Control panel
- 35 02 System cabinet
- 36 03 Power supply
- 37 04 Annunciator/keypad bus
- 38 05 Batteries
- 39 06 Wiring
- 40 07 Conduit
- 41 08 Associated peripheral devices
- 42 09 Other relevant components and accessories required to furnish and install a complete
43 and operational addressable reporting Life Safety System.
- 44 10 **Coordinate all counts and design per DIV 8 Hardware Specifications.**

1 **2.2 STANDARDS**

2 The system shall be listed as a Power Limited Device and be listed under the standards below. Each system
3 shall be supplied with complete details on all installation criteria necessary to meet all of the listings.

Burglary Listings	U.S. Government Standards/Listings
UL 1023 Household Burglar Alarm System Units	Meets ICD 705 Chapter 7 Intrusion Detection Systems (IDS)
UL 1076 Proprietary Burglar	Meets DoD/NIST SCIF Standards
UL 1610 Central Station Burglar Alarm Units	Related Standards
UL 1635 Digital Burglar Alarm Communicator System Units	NFPA 70 National Electric Code (NEC)
Fire Listings	NFPA 72 Local Protective Signaling
UL 864 Control Units for Fire Protective Signaling Systems	NFPA 72 Remote Station Protective Signaling
UL 985 Household Fire Warning	NFPA 72 Proprietary Protective Signaling
California State Fire Marshal	NFPA 72 Household Fire Warning
New York City FDNY COA #6167	Canadian Burglary Listings
Access Control Listings	ULC C1023 Household Burglar
UL 294 Access Control System Units	ULC/ORD-C1076 Proprietary Burglar
NIST	ULC S304 Central Station Burglar
AES Algorithm Certificate #2350 128	Canadian Fire Listings
AES Algorithm Certificate #2595 256	ULC S545 Household Fire
	ULC S559 Fire Signal Receiving Centres and Systems

4 **2.3 AMERICANS WITH DISABILITIES**

5 All indicating and notification appliances shall comply with the Americans with Disabilities Act (ADA)
6 requirements.

7
8 **3.0 SUBMITTALS**

9 **3.1 General Requirements**

10 The contractor shall submit three (3) complete sets of documentation within thirty (30) calendar days after
11 contract award date. Indicated in the document shall be the manufacturers' names, catalog number, type,
12 size, style, rating, and catalog data sheets for all items proposed to meet these specifications.

13 **3.2 Shop Drawings**

14 Shop drawings shall be submitted in accordance with Section 3.0 Submittals and shall consist of a
15 complete list of equipment and materials, including manufacturer's descriptive and technical literature,
16 performance charts and curves, catalog cuts, and installation instructions.

17 **3.3 As-Built Drawings**

18 The contractor shall provide a complete set of as-built drawings for the entire system upon installation
19 completion. These drawings shall include, but not be limited to, the exact locations of all equipment,
20 connections between all equipment, and wiring for all equipment as the system is installed.

21 **3.4 Spare Parts Data**

22 After shop drawings are approved, and not later than thirty (30) calendar days prior to the date of
23 beneficial occupancy, a list of spare parts data for each item of specified materials and equipment shall be
24 submitted. The data shall include a complete list of parts and supplies with current unit prices and source
25 of supply. Spare parts shall consist of, but not be limited to, five (5) percent of all initiating and notification
26 appliances with a minimum of one (1) each. All spare parts shall be on site prior to commencement of
27 acceptance testing. Depleted spare parts shall be replaced prior to beneficial occupancy.

1 **3.5 Operating Documents**

2 The contractor shall furnish to the architect operating instructions outlining the step-by-step procedures
3 required for system start-up, operation, and shutdown at least thirty (30) calendar days prior to
4 acceptance test. The instructions shall include the manufacturer’s name, system model number, service
5 manual, parts list, and a description of all equipment and their basic operating features.

6 **3.6 Maintenance Documents**

7 The contractor shall furnish maintenance instructions listing routine maintenance procedures, possible
8 breakdowns and repairs, and troubleshooting guides at least 30 calendar days prior to acceptance test.

9 **3.7 Performance Test Reports**

10 Upon the installed system completion and testing, test reports shall be submitted in booklet form showing
11 all field tests performed to prove compliance with specified performance criteria.

12 **3.8 Warranty**

13 A copy of the manufacturer’s warranty for all equipment and materials shall be provided. Warranty shall be
14 for all equipment, materials, installation, and workmanship for a minimum of three (3) years, unless
15 otherwise specified.
16

17 **4.0 GENERAL COMPONENT REQUIREMENTS**

18 **4.1. Component Enclosure**

19 Housings; power supply enclosures, terminal cabinets, control units, and other component housings,
20 collectively referred to as enclosures shall be so formed and assembled as to be sturdy and rigid. If sheet
21 steel is used in the fabrication of enclosures, it shall be not less than an 18-gauge door with a 20-gauge box
22 frame. Where exposed pins, the hinges shall be of the tight pin type or the ends of hinge pins shall be tack
23 welded to prevent ready removal. Doors having a latch edge length of less than 24 inches shall be provided
24 with a single lock. Where the hinged door latch edge is 24 inches or more in length, doors shall be provided
25 with three-point latching device with lock; or alternatively with two locks, one located near each end. For
26 SCIF and High Security applications an attack proof enclosure with proper tamperers listed for use with the
27 XR150/XR350/XR550 with Network and Encryption shall be used.
28

29 **4.2 Electronic Components**

- 30 A. All system electronic components shall be solid-state type, mounted on printed circuit boards. Light
31 duty relays and similar switching devices shall be solid-state type or electromechanical.
32 B. The panel shall have an over current notification LED that lights when devices connected to the
33 Keypad Bus and Loop Expansion LX-Bus(es) draw more current than the panel is rated for. When the
34 over current LED lights, the Loop Expansion LX-Bus(es) and Keypad bus are shut down.

35 **4.3 Control Unit**

- 36 A. A battery test shall be automatically performed to test the integrity of the standby battery. The test
37 shall disconnect the standby battery from the charging circuit and place a load on the battery. This
38 test shall be performed no more than every 180 seconds.
39 B. The control unit shall be capable of operating and supervising notification appliance devices as well
40 as addressable initiating detection devices and an integrated supervised dual line digital
41 communicator.
42 C. Control unit must be “Flash ROM” updatable, and program must be held in non-volatile RAM. The
43 panel shall be able to function while the update is in process.

- 1 D. Control unit shall be capable of operating using an optional built in Encrypted Alarm Router for SCIF
2 (Sensitive Compartmented Information Facility) application that is certified by NIST (National
3 Institute of Standards and Technology) for 128-bit or 256-bit AES (Advanced Encryption Standard)
4 Encryption communications.
- 5 E. The optional built-in Encrypted Alarm Router shall be capable of compliance with ICD 705 Chapter 7
6 Intrusion Detection Systems (IDS) and UL 2050 standards.

7 **4.4 Remote Annunciators**

- 8 A. The system shall support a maximum of sixteen (16) supervised remote annunciators with the
9 identical capabilities, functions and display layout. Operation of the remote annunciators shall be
10 limited to authorized users by the use of a code or key.
- 11 B. The remote annunciators shall be capable of operating at a maximum wiring distance of 15,000 feet
12 from the control unit on unshielded, non-twisted cable.

13 **4.5 Control Designations**

14 Controls shall be provided to ensure ease of operation of all specified characteristics. Where applicable,
15 clockwise rotation of controls shall result in an increasing function; controls, switches, visual signals and
16 indicating devices, input and output connectors, terminals and test points shall be clearly marked or
17 labeled on the hardware to permit quick identification of intended use and location.

18 **4.6 Test Function**

- 19
- 20 A. The system shall include a provision that permits testing from any alphanumeric keypad. The test
21 shall include standby battery, alarm bell or siren, and communication to the central station.
- 22 B. The system shall include a provision for an automatic, hourly, daily, weekly, thirty (30) day, or up to
23 sixty (60) day communication link test from the control panel installation site to the central station.
- 24 C. The system shall include a provision for displaying the internal system power and wiring conditions.
25 Internal monitors shall include the bell circuit, AC power, battery voltage level, charging voltage,
26 panel box tamper, phone trouble line 1, phone trouble line 2, transmit trouble, and network trouble.

27 **4.7 Power Supplies**

- 28 A. Power supplies for the control unit shall operate from 120 Vac, supplied at the respective protected
29 areas. Standby batteries shall be supplied to power the system in the event of a utility power failure.
30 Batteries shall be sized to provide 105% capacity for eight hours. Standby batteries shall be sealed
31 lead-acid. Power supplies shall be all Solid State.
- 32 B. Controls shall be designed to maintain full battery charge when alternating current is available.
33 Batteries shall be recharged to 85% capacity within 24 hours from battery use. The system shall be
34 automatically transferred to battery power upon loss of alternating current power and return to
35 alternating current power upon restoration. Intrusion alarms shall not be initiated during switch
36 over; a signal shall be initiated upon failure of battery or alternating current power.
- 37 C. Approved power supplies shall meet or exceed the following power supply model specifications:
38
- UL Listed DMP 505-12: 12Vdc 5 Amp with transformer and enclosure.

39 **4.8 Software**

- 40 A. The system shall interface with computer software with the capability to fully program the panel by
41 connecting to the panel through:
- Direct cable connection interface card
 - Receiver phone line connection
 - Standard phone line connection
- 44

- 1 • Ethernet network connection
 - 2 • Network connection across the Internet
 - 3 • Cellular network connection using the 263C or 263H Cellular Communicators
- 4 B. The system shall interface with computer software capable of locking down all controlled doors.
- 5 C. The system shall interface with computer software capable of monitoring and logging all events.
- 6 D. The system shall interface with computer software capable of exporting reports in the following file
- 7 formats:

Excel spreadsheet (*.xls)	Text (*.txt)
Rich Text (*.rtf)	Comma-separated (*.csv)
Windows Metafile (*.wmf)	HTML document (*.htm)
QuickReport (*.grp)	

- 8
- 9 E. The system shall interface with computer software capable of printing custom, filtered reports
- 10 including:

All Events	Door Access Granted
Zone Action	Door Access Denied
Arming/Disarming	Opening/Closing Schedule Changes
Area Late to Close	System Monitors
User Code Changes	System Events

11

12 **Entré – Access and Security Management Software**

13 **System Features:**

- 14 A. The software shall be available in three package sizes.
- 15 Entré Lite™: Shall have 16 doors included, and a maximum of four XR150/XR350/XR550 Series panels,
- 16 personnel management, full reports, and event management.
- 17 Entré Business™: Shall have the same features as Entré Lite with the option of expansion to 96 doors
- 18 maximum and up to 24 XR150/XR350/XR550 Series panels.
- 19 Entré Enterprise™: Shall have the same features as Entré Business with 96 doors included with the ability
- 20 to expand to an unlimited number of doors, users and XR150/XR350/XR550 Series panels.
- 21 B. Shall have simple user management, with the ability to import users from existing databases.
- 22 C. Shall be able to assign user access by group, facility or other parameters.
- 23 D. Shall have drop down lists for devices, user data and other information to facilitate fast and
- 24 accurate searches.
- 25 E. Shall be able to view system status in one of a variety of views for simplified alarm monitoring
- 26 management.
- 27 F. Shall have the capability to customize reports for added flexibility.

28

29 **User Management:**

- 30 A. It shall have the ability to import into Entré from existing systems via standard comma-separated
- 31 value (CSV) format files. It shall easily add new users, capture and edit their photo for badging or
- 32 visual verification from within the application.
- 33 B. User fields shall be fully customizable. Assign specific rights or events by user or by group. The
- 34 software shall be able to create effective/expiration time for users, limiting access to only certain
- 35 times of the day, and only certain days, or for only a defined period of time.

36

37

38 **AES Encryption:**

1 A. Entré Enterprise shall support the XR550 Series with Encryption panel AES (Advanced Encryption
2 Standard) strong data security for sensitive personnel and facility data.

3

4 **Highly Customizable:**

5 A. The software shall be extensively customizable to create a system that matches the end user's
6 application's needs.

7 B. Shall define what events are considered "alarms," and what response is required from the system
8 operator.

9 C. Shall be able to tailor user data with up to 20 available user-defined fields.

10

11 **Hierarchical Views:**

12 A. The software shall have the ability to select from four different system views, with the ability to
13 have multiple views open simultaneously. Select the graphical Map view, tabular Event view, or
14 hierarchical Tree view.

15 B. The software shall be able to click on a device or alert to access additional information and process
16 the event. In text-based views, software shall have simple drill downs to allow fast navigation to the
17 desired item.

18

19 **Powerful Search:**

20 The software shall employ industry standard SQL database for quick and easy search to identify any
21 desired device or user which is compatible with nearly any database.

22

23 **Single-System Control:**

24 The software shall employ a network solution to manage installations and users from any location. A
25 single, unified database means there's one badge, one face or one fingerprint, worldwide.

26

27 **Entré – Access & Security Management Software**

28 **Optional System Modules:**

- 29 • ENTRE-4DR Additional 4-Doors
- 30 • ENTRE-16DR Additional 16-Doors
- 31 • ENTRE-32DR Additional 32-Doors
- 32 • ENTRE-64DR Additional 64-Doors
- 33 • ENTRE-STD Standard Client
- 34 • ENTRE-WEB Web Client
- 35 • ENTRE-MAPS Alarm Graphics
- 36 • ENTRE-AUTO Automation Module
- 37 • ENTRE-DVR DVR Module
- 38 • ENTRE-PART Database Partitioning
- 39 • ENTRE-LANG Multiple Language module
- 40 • ENTRE-LDAP Lightweight Directory Access Protocol
- 41 • ENTRE-IMAGE Personnel Image Capture
- 42 • ENTRE-BADGE Badge Designer
- 43 • ENTRE-SIGN Signature Capture

44

45 **Optional System Modules Features:**

46 A. Shall be able to Point-and-click control of alarms and devices.

- 1 B. Shall have a modular design to enable customization, with optional modules for added features.
- 2 C. Shall be available in French, Spanish, or English, with dual-language operation mode.
- 3 D. Shall have full reporting, including at-a-glance dashboard graphics and charts or traditional tabular
- 4 displays, with the ability to produce reports in a variety of file types.
- 5 E. Shall have DVR integration.
- 6 F. Shall have image management of users and event photos.
- 7 G. Shall have a custom badge builder and video badging.

8
9 **Door Modules:**

10 The software shall allow for the addition of additional doors to support Entré Business or Enterprise
11 systems.

12
13 **Alarm Graphics:**

- 14 A. The software shall allow for the addition of additional doors to support Entré Business or Enterprise
- 15 systems.
- 16 B. Shall have the ability to give graphical representation of events and alarms at-a-glance and give
- 17 feedback of system status.
- 18 C. Shall have the capability to upload an unlimited number of graphical images of protected facilities in
- 19 a variety of file formats.
- 20 D. System maps are linked from level to level, allowing drill down from a macro view to a specific room
- 21 or area.
- 22 E. View alarm status at every level of zoom.
- 23 F. User-defined layers representing different alarm types allow you to customize the graphical
- 24 interface to meet application needs.
- 25 G. Once loaded, it shall have the ability to plot alarm devices on the graphics using drag-and-drop
- 26 selections from a hierarchical list of hardware. Identify the areas on your site maps, defining them by
- 27 Classification, Entrances, Zones, and Partitions.
- 28 H. It shall have total picture-based monitoring and control of the system. It shall from facility-wide
- 29 views be able to click to zoom in on any area of the facility and view the real-time status of any
- 30 device.
- 31 I. The software shall be able to click on the alarm display icon to acknowledge an alarm or to request
- 32 additional information

33
34 **Automation Module:**

- 35 A. The software shall be able to give advanced users the power to create automated system actions.
- 36 B. The software shall be able to define automatic responses to any system alarm or events. These
- 37 include generating a report, generating an alert email, or sending commands to selected devices.
- 38 C. Shall be able to create scheduled system actions to run once at a specified time and date, or
- 39 scheduled events that repeat at user defined time and date intervals.
- 40 D. System automation enables configuration of unattended activities, freeing system managers from
- 41 many routine responsibilities.

42
43 **DVR:**

- 44 A. The software shall be able to quickly connect to a DVR to review video based on a received alarm
- 45 from a control panel.
- 46 B. Connect to DVR from a graphical map of the area to review activity.

- 1 • Verint
- 2 NetDVR I, firmware 6.47.x or higher
- 3 NetDVR II, firmware 8.7.x or higher
- 4 EdgeVR, all firmware versions
- 5 • 3VR
- 6 E-Series
- 7 P-Series
- 8 S-Series
- 9 ServerClass
- 10 • March Networks™
- 11 3204 Digital Video Recorder (3000 Series)
- 12 4000 C NVR (4000 C Series)
- 13 • Dedicated Micros
- 14 All NetVU compatible series 2 and 3 DVRs

15

16 **Database Partitioning:**

- 17 A. The software shall allow system information to be contained in a single unified database allowing
- 18 system managers to limit user access to only certain areas of the database to partition the
- 19 information.
- 20 B. The software shall allow organization of data into separate collections by physical area, hardware
- 21 types, events, or other parameters.

22

23 **Multi-Language:**

- 24 A. The software shall support multiple languages enabling multiple operators to select a language
- 25 during their login process. The software shall allow text shown both in English and a second selected
- 26 language.
- 27 B. Available languages shall include:
- 28 • English
- 29 • French
- 30 • Spanish

31

32 **LDAP (Lightweight Directory Access Protocol):**

- 33 A. The software shall provide LDAP single sign-on for users, enabling them to use one password to
- 34 access multiple system services.
- 35 B. System user information can be imported directly from an existing LDAP Tree.

36

37 **Badge Image Capture:**

38 The software shall allow the transfer of pictures of users from a digital camera directly onto a badge.
39 Select a TWAIN source to capture the image to allow up to date images on employee badges.

40

41 **Badge Designer:**

- 42 A. The software shall have the ability to create one or more badge designs, customizing badges by
- 43 facility, user level, or other parameters.
- 44 B. When badging employees or visitors, select the desired badge template from library. The template
- 45 automatically populates with the appropriate data, ready for printing.

46

1 **Signature Capture:**

2 Shall use a signature capture device to provide the ability to capture employee or visitor signatures and
3 store the images.

4
5 **Reporting Dashboard:**

6 A. The software shall have interactive graphics for instant feedback on system activity.

7 B. The software shall be able to choose a number of charts for functions such as Access Granted
8 /Denied at a particular access point or an entire facility to get a snapshot of activities within any
9 defined time period.

10 C. Shall have ability to filter through user, activity, or event data to narrow results and show precisely
11 the information needed.

12 D. Shall have the ability to view reports from within the application, or saved and exported to PDF,
13 HTML, XLS, CSV, or XML format for distribution.

14 E. Shall automate custom reports to generate and distribute each day at desired times.

15 **4.10 Control Panel Capability**

16 A. The basic control panel shall provide:

- 17 • Expansion to a total of at least 10,000 user codes with 99 user profile definitions.
- 18 • Temporary user codes that can be entered with a finite date and specific time to expire.
- 19 • Sixteen (16) independent door/keypad addresses, each with four zones on XR550 and XR350, with
20 eight (8) on the XR150.
- 21 • A total door access granted event buffer of at least 10,000 events.
- 22 • Anti-passback access control selectable by area and user.
- 23 • A total of at least 99 programmable Schedules for output relay schedules, area schedules, door
24 schedules, holiday schedules, and user profiles. The same schedule may be assigned to more than
25 one area, door, or output, making them reusable. There shall be at least two schedules per user
26 profile with up to four profiles per user. Up to 8 Schedules per user, per door, per area, and per
27 output.
- 28 • Eight Areas (8) individual reporting areas XR150, Sixteen (16) individual reporting areas XR350, and
29 Thirty-two (32) individual reporting areas XR550.
- 30 • Built-in bell and telephone line supervision.

31 B. The networked control panel shall provide the entire above plus:

- 32 • All of the above features plus.
- 33 • Require two-man access code or credentials. Require two user code entries to disarm and/or allow
34 door access to this area.
- 35 • Support programming to require the same or different access code entered within a programmed
36 delay time of 1 to 15 minutes after disarming before activating a silent ambush alarm.
- 37 • Early Morning Ambush. Must disarm a second time with in a programmed period of time or an
38 early morning ambush silent alarm is sent.
- 39 • Bank Safe & Vault features. Schedules set for this area and the time of day cannot be changed
40 while the area is armed.

41 C. The XR550 encrypted control panel shall provide the entire above plus:

- 42 • All of the basic and network features listed plus.
- 43 • Built-in Encrypted Alarm Router.
- 44 • Certified operation that meets NIST (National Institute of Standards and Technology) standards
45 for
46 128-bit and 256-bit AES (Advanced Encryption Standard) Encryption.

- 1 • Certification that encrypted panel is capable of meeting ICD 705 Chapter 7 Intrusion Detection
- 2 Systems (IDS) Standard.
- 3 • Certification that encrypted panel is capable of meeting UL 2050 standards.
- 4 • Card plus Pin for High security card access is provided by the Card Plus Pin feature that requires
- 5 both a card read and a PIN (4-6 digit user ID) entry for arming/disarming and access by area. This
- 6 Card Plus Pin operation complies with the ICD 705 requirement for dual id authentication and
- 7 operates with a DMP Prox Keypad and a HID ProxPro reader with the keypad connected to a DMP
- 8 Wiegand Interface module.
- 9 • Panic Test allows the panic zone test verification and failure results to be sent to the central
- 10 station receiver.
- 11 • Passphrase of 8-16 characters to validate encryption between the XR550 with Encryption and the
- 12 Central Station Receiver.

13
14

5.0 FUNCTIONAL DESCRIPTIONS

15 5.1 System Description

- 16 A. The system areas and zones shall be programmable, and the system shall store, log, display, and
- 17 transmit specific custom designations for system areas, zones, and user names.
- 18 B. To ensure continued, one-call support, the system shall be constructed of sensing components
- 19 provided directly by the system manufacturer, such as power supplies, motion detectors, door and
- 20 window position switches, glass break detectors, or other sensing devices that the manufacturer
- 21 offers.
- 22 C. The system controller, user interfaces, zone input devices, relay output devices, and the system
- 23 signal receiving equipment shall be engineered, manufactured, assembled, and must be distributed
- 24 from a location within the United States of America.
- 25 D. The system shall support user interaction by way of a keypad, web browser, system software, key
- 26 switch, or radio frequency wireless control, Text messaging, or Smart Phone Application using
- 27 integrated or auxiliary devices provided by the system manufacturer.
- 28 E. The system shall support controller zone input connections, system keypads, system zone
- 29 expansion modules, and wireless zone input modules, and must support zone input connections by
- 30 way of at least two competitive products. The system shall offer a seamless integrated compatibility
- 31 with hard-wire and/or wireless zone expansion equipment for at least 500 wireless zones and/or a
- 32 maximum of 574 hardwired zones.
- 33 F. The system shall be capable of offering up to five zone expansion buses, each of which can support
- 34 the connection of up to 15,000 feet of four-wire cable. Zone expansion and keypad data buses that
- 35 exceed 2,500 feet of cable must include splitter/repeater modules to boost data voltage and
- 36 maintain data integrity.
- 37 G. The system shall provide a seamless capability to provide up to 506 addressable relays, which can be
- 38 located at any connection location upon a zone expansion bus.
- 39 H. System relay outputs shall have the capability of being triggered as a result of a command from the
- 40 user interface, changes in system status, changes in zone status, or by a programmable schedule.
- 41 I. System relay output states shall be programmable for momentary, maintained, pulsed, or must
- 42 follow the state of an associated system zone input.
- 43 J. The system shall be completely programmable either locally from a keypad or remotely through a
- 44 standard dial-up, and network connections by way of a LAN, WAN, and/or by way of the Internet,
- 45 cellular communications paths.
- 46 K. The control unit shall be completely programmable remotely using remote annunciators, and/or
- 47 using upload/download software that communicates using SDLC 300 baud, 2400 baud, or IP
- 48 Addressed data network. On-site programming from a personal computer shall also be permitted.

1 L. The control unit shall be equipped with an anti-reversing circuit breaker to prevent damage due to
2 accidental reversal of battery leads.

3 **5.2 Input/output Capacity**

4 A. This system shall be capable of monitoring a maximum of 574 individual zones and controlling a
5 maximum of 506 output relays.

6 B. The control panel shall have, as an integral part of the assembly, 2 SPDT Form C relays rated at 1
7 Amp at 30 Vdc and four open collector 12 Vdc outputs rated at 50mA each. It shall also have the
8 capacity of a maximum of 125 output expander modules with 500 switched ground, open collector
9 outputs, 50mA maximum and 506 auxiliary relays (Form C rated at 1.0 Amp at 30 Vdc).

10 C. The panel shall also provide 99 programmable output profiles for schedules, and include an integral
11 bell alarm circuit providing at least 1.5 Amps of steady, pulsed, or temporal bell output. Output type
12 shall be programmable by zone type. Relays and voltage outputs shall be capable of being
13 independently programmed to turn on and/or off at selected times each day.

14 D. The system shall be capable of supporting and controlling up to 232 Z-Wave devices and up to 20 Z-
15 Wave Favorites for group control.

16 **5.3 User/Authorization Level Capacity**

17 The system shall be capable of operation by 10,000 unique Personal Identification Number (PIN) codes
18 with each code having one (1) of ninety-nine (99) custom user profiles. This allows for limitation of certain
19 functions to authorized users. The operation of all keypads shall be limited to authorized users.

20 **5.4 Keypads**

21 A. The system shall support a maximum of sixteen (16) keypads on XR550/XR350 Series or eight (8)
22 keypads on XR150 Series with alphanumeric display. Each keypad shall be capable of arming and
23 disarming any system area based on a pass code or Proximity key authorization. The keypad
24 alphanumeric display shall provide complete prompt messages during all stages of operation and
25 system programming and display all relevant operating and test data.

26 B. Communication between the control panel and all keypads and zone expanders shall be multiplexed
27 over a non-shielded multi-conductor cable, as recommended by the manufacturer. This cable shall
28 also provide the power to all keypads, zone expanders, output expanders, and other power
29 consuming detection devices.

30 C. If at any time a keypad does not detect polling; the alphanumeric display shall indicate "SYSTEM
31 TROUBLE". If at any time two devices are programmed for the same address, the alphanumeric
32 keypad shall display "4 WIRE BUS TROUBLE". If at any time a keypad detects polling but not for its
33 particular address, the alphanumeric display shall indicate "NON POLLED ADDR". The system shall
34 display all system troubles at selected keypads with distinct alphanumeric messages.

35 D. The keypad shall include self-test diagnostics enabling the installer to test all keypad functions:
36 display test, key test, zone test, LED test, relay test, tone test, and address test.

37 E. The keypad shall provide an easy-to-read English text display. The text shall exactly match the text
38 seen in all software reports, keypad displays, and central station reports.

39 F. The keypad user interface shall be a simple-to-use, menu-driven help system that is completely user
40 friendly.

41 G. The control panel shall support a keypad interface accessible on the World Wide Web in a browser
42 window. The web-accessible keypad interface shall provide at least five (5) programmable hyperlinks
43 for camera access or other use.

1 **5.5 Zone Configuration**

2 A. A minimum of 4 Class B ungrounded zones shall be available at each keypad or zone expander on
3 the system.

4 The system shall have the capacity for a maximum of sixteen (16) keypads and a maximum of 125
5 four (4) zone expanders or 500 single zone expanders on the XR550. It shall also have the capacity of
6 a maximum of 125 supervised relay output expanders. The XR350 shall have the capacity for a
7 maximum of sixteen (16) keypads and a maximum of 125 four (4) zone expanders. It shall also have
8 the capacity of a maximum of 75 supervised relay output expanders. The XR150 shall have the
9 capacity for a maximum of eight (8) keypads and a maximum of 25 four (4) zone expanders It shall
10 also have the capacity of a maximum of 25 supervised relay output expanders. All Class B zones shall
11 be 2-wire, 22 AWG minimum, supervised by an end-of-line (EOL) device and shall be able to detect
12 open and short conditions in excess of 500ms duration.

13 B. Each zone shall function in any of the following configurations: Night, Day, Exit, Fire, Supervisory,
14 Emergency, Panic, Auxiliary 1, Auxiliary 2, Fire Verification, Cross Zone, Priority, and Key Switch
15 Arming.

16 C. The digital SLCs and the annunciator/keypad bus shall be able to operate at a maximum wiring
17 distance of 2500 feet from the control panel on unshielded, non-twisted cable. This distance may be
18 extended to a total of 15,000 feet when bus repeater modules are installed.

19 D. Each zone shall function in any of the following configurations:

Night	Supervisory	Auxiliary 1	Cross-Zone
Day	Emergency	Auxiliary 2	Priority
Exit	Panic	Fire Verification	Arming
Fire			

20 **5.6 Communication**

21 A. The system shall be capable of signaling to as many as 8 remote monitoring station receivers. Seven
22 (7) of the eight (8) paths shall be capable of being assigned as either a “primary” or “backup” path.
23 In such a manner the system shall have multiple primary paths to multiple remote monitoring
24 stations as well as multiple backup paths to multiple monitoring stations.

25 B. The system shall employ Adaptive Technology that allows a Backup communication path
26 programmed for Network or Cellular to automatically ADAPT to the faster check-in rate of the
27 Primary path should the Primary path become unavailable. This creates a seamless transition for
28 communication.

29 C. The system shall be capable of dialing up to (2) remote monitoring station receivers, four telephone
30 numbers of 32 digits each using two separate switched telephone network lines such that if two
31 unsuccessful attempts are made on the first line to the first number, the system shall make two
32 attempts on first line to the second number. If these two attempts are unsuccessful, the system shall
33 make two further attempts on the first line of the first number. After the tenth unsuccessful
34 attempt, dialing shall stop, and the alphanumeric keypad shall display trouble. Should another event
35 occur that requires a report to be transmitted, the dialing sequence shall be repeated. The system
36 shall have a programmable option to dial a second set of telephone numbers after the first ten
37 attempts using the same sequence.

38 D. The system shall be capable of communication using the IBM Synchronous Data Link Control
39 format, and at least one other standard industry format.

40 E. The system shall be capable of supporting Network communication with digital dialer backup,
41 existing Ethernet data networks, satellite communication, fiber optic networks, local area networks,
42 wide area networks, cellular communication, and retail data networks.

5.7 Network Communication

- A. The control panel shall be capable of asynchronous network communication with a retry time between 2 and 240 minutes and a fail time of 2 and 240 minutes. If communication is unsuccessful the control panel shall be capable of attempting backup communication through any of the available communication methods to the same receiver or a backup receiver.
- B. The control panel shall employ adaptive communication technology. Adaptive Technology allows a Backup communication path programmed to use Network or Cellular to automatically ADAPT to the faster check-in rate of the Primary path should the Primary path become unavailable, creating a seamless transition for communication of messages. Select Adapt when programming the Checkin option. This allows a system to be fully supervised even if a path fails, while also keeping wireless charges low when the network is good.
- C. Network communication between the control panel and the receiver shall be in a proprietary communication format.
- D. The control panel shall be capable of supporting Dynamic Host Communication Protocol (DHCP) Internet Protocol (IP) addressing.
- E. Underwriters Laboratories (UL) shall list network communication by the control panel for Standard or Encrypted Line Security.
- F. The control panel shall be capable of two-way network communication using standard Ethernet 10/100 BaseT in a LAN, WAN, or Internet configuration.
- G. The control panel shall be capable of communication by means of a 128-bit or 256-bit AES (Advanced Encryption Standard) Encryption process certified by NIST (National Institute of Standards and Technology) to an SCS-1R receiver with an SCS-104 line card or SCS-VR (SCS-VR currently supports 128-bit encryption only).
- H. The control panel shall be capable of meeting ICD 705 Chapter 7 Intrusion Detection Systems (IDS) and UL 2050 standards.
- I. The control panel shall be capable of sending text messaging to up to three Cellular Phone Numbers using cellular communications.
- J. The control panel shall be capable of sending the following SMS messages:

Zone Alarms by Zone Name	AC Power Trouble and Restoral
Zone Troubles by Zone Name	System Low Battery
Zone Bypass by User	Ambush
Arming (Closings) by User	Abort, Cancel and Alarm Verified by User
Disarming (Openings) by User	Check-in by user
Late to Close	

5.8 Cellular Communications

- A. The control panel shall have the capability to communicate with a plug-in cellular HSPA+ communicator model number 263H or CDMA communicator model number 263C that shall plug into the control panel J24 connector which shall supply full data communication and power to the 263H or 263C cellular communicator. The cellular communicator shall be capable of communicating full panel alarm and auxiliary messages to the DMP SCS-1R Central Station or SCS-VR Receiver as well as SMS text messaging to a PC, PDA, or Cellular telephone.
- B. The control panel shall be capable of sending the following SMS messages

Zone Alarms by Zone Name	AC Power Trouble and Restoral
Zone Troubles by Zone Name	System Low Battery
Zone Bypass by User	Ambush
Arming (Closings) by User	Abort, Cancel and Alarm Verified by User
Disarming (Openings) by User	Check-in by user
Late to Close	

1 **5.9 TCP/IP Network Trapping**

2 A. The control panel shall be capable of having communication set to Network operation. When a trap
3 is set in Remote Link, the software shall be capable of sending a panel trap message with the panel
4 account number to the SCS-104 installed in an SCS-1R receiver.

5 B. The receiver SCS-104 shall store the trap and monitor the panel for the next message. When the
6 panel sends its next message, the receiver SCS-104 shall then send a message to the panel to contact
7 Remote Link at the IP address contained in the original trap message.

8 C. The trap message shall be stored in the receiver SCS-104 for up to four hours. If the trap message is
9 not sent to the panel within the four-hour window, the panel trap message shall be discarded, and a
10 new trap message must be sent from Remote Link.

11 D. The user shall be able to view the trap status in the receiver SCS-104 in Remote Link using the Trap
12 Query function.

13
14 **6.0 INTEGRATED INTRUSION ALARM AND ACCESS CONTROL OPERATION**

15 **6.1 Access Authority Levels**

16 The system shall be capable of programming access credentials authority levels to check whether the user
17 has access to a specific area and also has the authority to disarm or arm the area. If the user access
18 credential has access and disarm/arm authority the system shall provide the user the option to disarm the
19 area simultaneously upon opening the door, or to open the door and begin an entry delay timer. With the
20 timer option the user then disarms the area using an intrusion control keypad inside the area. If the user
21 only has access authority to the area and the area is in an armed condition, the user is denied access to the
22 area.

23 **6.2 Door Open Schedule Override**

24 The system shall be capable of programming certain area doors to be scheduled to unlock and lock at
25 specific times of the day or night. The lock/unlock function shall be capable of an override option
26 depending upon the area armed/disarmed status. If the area remains in an armed status at the scheduled
27 unlock time the armed status overrides the unlock schedule ensuring the doors remain locked and armed
28 in situations where the business might open late, close early, is affected by inclement weather, or another
29 emergency.

30 **6.3 Common Area**

31 The system shall be capable of programming a common area to be armed when the last area in the system
32 is armed and disarmed when the first area in the system is disarmed. To ensure the common area works
33 properly it shall not have any user codes assigned to the common area. The system shall also be capable of
34 programming multiple common areas.

35 **6.4 Area Access Control**

36 A. The system shall be capable of integrating area access control capability where specified into the
37 same control panel with the ability to have up to 10,000 user credentials. User access is limited to
38 custom profiles and/or schedules. Anti-passback shall be available. The networked version shall
39 support a Two-Man Rule feature. The system shall support up to sixteen (16) access doors,
40 connected to the system using a manufacturer-approved interface module.

41 B. Area door access products shall meet or exceed features offered by the following products:

- 42 • Keypad reader/administration device – DMP Model 7063/7063A, 7073/7073A, 7163/7173, 7872, 7873
- 43 • Wiegand Interface – DMP Model 734, 734N, or 734N-WIFI
- 44 • Reader – DMP Model PP-6005B, Model PR-5455, Model MP-5365
- 45 • Cards or credentials – DMP Model 1326, DMP Model 1306P, DMP Model 1346, DMP Model 1386

1

2 **6.5 Access Control Equipment**

3 Access Control equipment shall communicate to the system by way of the control panel keypad bus. The
4 equipment shall have a three (3) year warranty and meet or exceed features offered in the products listed
5 in Section 11.5 of this document.

6 **6.6 Early Morning Ambush (XR550 only)**

7 A. The system shall be capable of programming an area to require two user codes be entered within a
8 programmed number of minutes to prevent an ambush message from being sent to the Central
9 Station Receiver. If both user codes are not entered within the time an ambush message is sent to
10 the central station receiver.

11 B. Both user codes shall have the authority to disarm the specific area and must be entered at the
12 same keypad or reader. The keypad shall not display any indication that the ambush timer is running.

13 C. The system shall be capable of programming an output to provide an external indicator that an
14 ambush situation is taking place.

15 **6.7 Two-Man Rule (XR550 only)**

16 The system shall be capable of programming an area to require two separate user codes be entered in
17 order to disarm and/or allow access to a specific area. Both required codes shall have at least the same or
18 greater authority level. Both required codes shall be entered within 30 seconds or an alarm shall activate.

19 **6.8 UL Bank Safe & Vault Operation (XR550 only)**

20 The system shall be capable of being programmed to only be disarmed during scheduled times regardless
21 of the authority level of any user code or user profile in the system. The schedule and time and date set for
22 this area shall not be capable of being changed while the area is armed. Zones assigned to Bank Safe and
23 Vault areas shall not be able to be bypassed or force armed.

24 **6.9 Panic Button Summary Test**

25 A. The system shall have the ability to test panic buttons without sending a panic alarm to the Central
26 Station Receiver.

27 B. The system shall also have the ability to send panic zone test verification and failure results to the
28 Central Station Receiver.

29 C. During the test, each time a panic zone trips, the display number shall increment and the keypad
30 buzzer sound for two seconds.

31 D. The number of panic zones tripped shall constantly display until the test ends or no panic zone
32 activity has occurred for 20 minutes.

33 E. When the Panic Zone Test ends and a zone failed (did not trip) during the test, the keypad shall be
34 able to display the zone name and number and have the buzzer sounds for one second. Additional
35 zone failed zones shall display when a button is pressed.

36 **6.10 One-man Walk Test**

37 A special code is also available for installers to test the system. The One-Man Walk Test feature allows a
38 single technician to check the panel response to burglary, fire, panic, and supervisory zones.

39 The system shall be programmed to display the User Menu and Status Display text in multiple languages.

40 **6.12 User Inactivity Audit**

41 System shall allow user code inactivity to notify the central station after a programmable period of days of
42 no activity. The system shall be programmable from 0-365 days.

1 **6.13 Lock Down**

2 The system shall for emergency situations, a lock down command can be issued from the keypad menu or
3 via remote command and locks all doors designated as public.

4 **6.14 Communication Function Diagnostics**

5 The system shall have enhanced diagnostic menu that enables technicians to check network and cellular
6 communication status and cell signal strength from the keypad.

7 **6.14 GUEST Operation**

8 The system shall be capable of in the Home/Sleep/Away with Guest House operation, create up to three
9 separate systems (main and two guests). Keypads in each system can selectively arm the perimeter,
10 interior, or bedrooms for only their protected areas. Main system users can add authorized users to all
11 protected areas, but guests can add users only for their protected system.

12
13 **7.0 FALSE ALARM REDUCTION FEATURES**

14 The system shall be capable of providing false alarm reduction features, functions, capabilities, or
15 processes that either require alarms be verified or potential alarms be corrected before a system or zone
16 can be placed into an armed state.

17 **7.1 Exit Error Alert and Reporting**

18 The panel shall be able to provide an automatic function to prevent a false alarm from occurring if an exit
19 door does not properly close after the system is armed.

20 **7.2 Entry and Exit Delay Annunciation**

- 21 A. When arming, the system shall provide clear annunciation indicators to the user about the need to
22 exit the premises prior to the exit delay time expiring.
23 B. When disarming, the system shall notify the user the need to disarm the system prior to the entry
24 delay time expiring.

25 **7.3 Remote Annunciation**

26 The system shall be able to provide entry and exit delay time period notification. This notification can be
27 from DMP keypads, remote annunciators, or bell tests.

28 **7.4 Abort Reporting**

29 The system shall be capable of sending an Abort report to the central station if the system is disarmed
30 while the alarm is still sounding. The Abort report shall be sent after the alarm report to notify the central
31 station that an authorized user has cancelled the alarm.

32 **7.5 System Testing**

33 The system shall offer testing features that are simple, quick, and complete and provide the highest
34 measure of safety by ensuring that alarm conditions are detected and communicated to the proper
35 authorities in a timely manner and on a regularly scheduled basis.

36 **7.6 Ambush Code**

37 The system shall offer ambush codes for those dangerous encounters where the user is instructed to
38 either arm or disarm the system under threat of harm. The duress code shall disarm the system without
39 giving local indication of an alarm that might put the user well-being in jeopardy.

1 **7.7 Two-Button Panic Feature**

2 The system shall support DMP keypads that provide the option to use only two-button panic codes. The
3 user shall be required to press and hold two designated keys for approximately two seconds before the
4 system generates a panic alarm.

5 **7.8 Fire Verify Zones**

6 The system shall support Fire Verify zones to help the panel verify the existence of an actual fire condition
7 before it sends an alarm report to the central station. The Fire Verify zone shall require the panel to
8 perform a Sensor Reset whenever a device connected to a Fire Verify zone initiates an alarm. This shall
9 begin a verification period during which the panel waits for a second alarm initiation. If the original zone or
10 any other Fire Verify zone on the panel initiates an alarm within the next 120 seconds, the panel shall
11 recognize this as an actual alarm and send an alarm report to the central station.

12 **7.9 Cross-Zoning Protection**

13 The system shall support cross-zoning as a means of requiring two device trips to occur within a short
14 period of time before sounding an alarm and sending an alarm report to the central station. Supported
15 device trips shall be from one device that trips two times, or from two devices that each trip once.

16 **7.10 Swinger Zone Bypassing**

17 The system shall be capable of automatically bypassing a zone if it goes into an alarm or trouble condition
18 a specified number of times within a one-hour period. The panel shall be able to track the number of times
19 the zone trips while armed and compare that against a programmed number. When that number is
20 reached, the panel shall be able to automatically bypass the zone. The panel shall be capable of resetting
21 the zone when the area to which it is assigned disarms, is manually reset from the keypad or remotely, or
22 remains normal for one hour.

23 **7.11 Recently Armed Report**

24 The system shall be capable sending a System Recently Armed report, along with a zone alarm report, to
25 the central station any time an alarm occurs within five minutes of the system arming. The System
26 Recently Armed report allows the central station operator to follow a “call the subscriber first” procedure
27 instead of immediately dispatching the police to what could be a false alarm.

28 **7.12 Transmit Delay**

29 The system shall be capable of programming the panel to wait up to 60 seconds before sending burglary
30 alarm reports to the central station. If an alarm is accidental, the user shall be able to disarm the system
31 within the programmed Transmit Delay time. An Abort report shall be sent in place of an alarm report after
32 the system disarms. During the alarm, sirens and panel relay outputs shall not be delayed and shall still
33 provide local condition annunciation.

34 **7.13 Call Waiting Cancel**

35 The system shall be capable of being programmed to cancel call waiting any time the panel dials the
36 receiver number to send a report.

37 **7.14 Cancel/Verify**

38 The system shall be capable of sending either a Cancel Report or Verify Report to the Central Station to
39 signify that the end user has Canceled an Alarm or Verified an Alarm condition. Also, the system shall be
40 programmable to instead of Cancel/Verify show “IS THIS A FALSE ALARM? NO YES”. If YES send validation
41 of alarm to Central Station, if NO send alarm cancel.
42

43 **8.0 Must meet ANSI/SIA CP-01-2010 Standards for False Alarm Reduction**

44 The system shall be capable of meeting ANSI/SIA CP-01-2010 Standards for False Alarm Reduction.

1 **8.1 Shall Meet Exit Delay Standards**

- 2 • Default – 60 seconds (Minimum 45 seconds)
- 3 • Progress Annunciation – different sound last ten seconds of delay
- 4 • Automatic Restart of running exit delay, one time upon re-entry
- 5 • Recent Closing – signal sent if alarm within 2 minutes of Exit time expiration (change from 5 min)
- 6 • Exit Error – Immediate local alarm and entry delay starts

7 **8.2 Shall Meet Entry Delay Standards**

- 8 • Default – 30 seconds (Minimum 30 seconds)
- 9 • Pre-Warning Silenced – after first digit code entry
- 10 • Cancel Message sent if disarmed after alarm sent

11 **8.3 Shall Meet Fail-to-Exit Standards**

12 When perimeter and exterior areas are defined and the user does not leave the building before the system
13 arms, the system only arms the perimeter and leaves the interior unarmed

14 **8.4 Shall Meet Automatic Restart Standards**

15 The system shall stop the Exit countdown once and restart it to allow the user to pick up a forgotten jacket
16 or briefcase and exit the building without sending an alarm to the central station.
17

18 **10.0 BURGLARY CONTROL SPECIFICATIONS**

19 **10.1 Burglary Standards**

20 The Burglary system shall be listed as a Power Limited Device and be listed under the standards below.
21 Each system shall be supplied with complete details on all installation criteria necessary to meet all of the
22 listings.

Burglary Listings	Canadian Burglary Listings
UL 1023 Household Burglar Alarm System Units	ULC C1023 Household Burglar Alarm System Units
UL 1076 Proprietary Burglar	ULC/ORD-C1076 Proprietary Burglar
UL 1610 Central Station Burglar Alarm Units	ULC S304 Central Station Burglar Alarm Units
UL 1635 Digital Burglar Alarm Communicator System Units	
U.S. Government Standards	
Meets ICD 705 Chapter 7 Intrusion Detection Systems (IDS)	
Meets DoD/NIST SCIF Standards	
Meets ANSI/SIA CP-01-2010 False Alarm Reduction	

23 **10.2 Area System Mode**

- 24 A. The system user shall be capable of selectively arming and disarming any one or more of 32 areas
25 within the intrusion detection system based on the user PIN code and/or keypad used. Each of the
26 574 zones shall be able to be assigned to any of the 32 available areas. The system shall be capable of
27 having up to a thirty-two (32) character length name programmed for each area.
- 28 B. The system user shall be capable of assigning an opening and closing schedule to all areas or to each
29 of the 32 areas separately. Each area shall be able to arm or disarm automatically by a schedule. The
30 system shall have the capacity for common areas that automatically disarm when any other area
31 disarms and that automatically arm when all other areas arm.

1 C. The networked system shall have the ability to comply with Bank Safe & Vault application. The
2 networked system shall also have the ability to use a two-man rule for disarming or allowing door
3 access to an area. The system shall have the ability to operate a Common Area application.

4 D. The Encrypted system shall have the feature of Card Plus Pin by area High security card access is
5 provided by the Card Plus Pin feature that requires both a card read and a PIN (4-6 digit user ID)
6 entry for arming/disarming and access by area. This Card Plus Pin operation complies with the ICPG
7 705 requirement for dual id authentication and operates with a DMP Prox Keypad and a HID ProxPro
8 reader with the keypad connected to a DMP Wiegand Interface module.

9 **10.3 Home/Sleep/Away Mode**

10 The system shall be capable of being configured in a Home/Sleep/Away configuration for Residential
11 applications. The system shall consist of a Main House system and up to two Guest House systems within
12 one single control Panel with each house being controlled with its own keypad as if it were separate alarm
13 systems.

14 **10.4 All/Perimeter Mode**

15 The system shall be capable of being configured into the All/Perimeter configuration to enable the
16 selective arming of both the interior and perimeter when armed “All” or arming just the perimeter devices
17 if arming “Perimeter”.

18 **10.5 Zones**

19 The system shall have a minimum of eight (8) grounded burglary zones available from the control panel,
20 and two floating ground powered zones for two wire type compatible smoke detectors. The system shall
21 have the ability to expand using the panel’s keypad bus for up to sixty-four additional zones. The system
22 shall also have five built-in zone expansion bus (LX500 – LX900) for an additional 500 zones of expansion.
23 The system shall have the ability to integrate up to 500 wireless zones for a total of 574 zones overall.

24 **10.6 Burglary Equipment**

25 Burglary detection equipment shall communicate to the system by way of the control panel loop
26 expansion bus or 900MHz bi-directional spread spectrum receiver. The detection equipment shall have a
27 three (3) year warranty and meet or exceed features offered in the products listed in Section 11.0 of this
28 document.

29 **10.7 Z-Wave Equipment**

30 The system shall be capable of 232 Z-Wave devices by means of the use of the model 738Z module. The
31 system shall have the capability of up to 20 Z-Wave favorites for grouping Z-Wave devices into a favorite
32 response or control.
33
34

35 **11.0 ACCESS CONTROL SPECIFICATIONS**

36 **11.1 Access Control Standards**

37 The access control system shall be listed as a Power Limited Device and be listed under the standards
38 below. Each system shall be supplied with complete details on all installation criteria necessary to meet all
39 of the listings.

Access Control Listings	U.S. Government Standards
UL 294 Access Control System Units	Meets ICD/ICS 705 Chapter 7 Intrusion Detection Systems (IDS)
	Meets DoD/NIST SCIF Standards

1 **11.2 Keypad**

2 A. The system shall display a message at any keypad when any system area remains disarmed past the
3 scheduled closing time. The message shall be displayed at one minute past the scheduled closing
4 time. A pre-warn tone shall also begin sounding. If the system is not armed or a schedule extended
5 within ten minutes past the scheduled closing time, the system shall provide the option of sending a
6 Late to Close report to the central station.

7 B. The keypad shall include a door strike relay capable of sending a report to the central station when
8 activated.

9 C. The keypad shall be capable of proximity arming and disarming functions.

10 D. The keypad shall display red backlighting when in alarm condition notifying an individual of an
11 unacknowledged alarm condition.

12 E. The keypad shall annunciate when canceling an alarm condition the words “Cancel” or “Verify” to
13 allow the end user the ability to cancel a user generated alarm or to select verify to send a message
14 to the central station that the alarm has been verified by the end user and to send emergency
15 response personnel. This is to comply with Alarm Verification.

16 **11.3 Area Access Control**

17 A. The system shall be capable of integrating area access control capability where specified into the
18 same control panel with the ability to have up to 10,000 user credentials. User access is limited to
19 custom profiles and/or schedules. Anti-passback shall be available. The networked version shall
20 support a Two-Man Rule feature. The system shall support up to sixteen (16) access doors,
21 connected to the system using a manufacturer-approved interface module.

22 B. Area door access products shall meet or exceed features offered by the following products:

- 23 • Keypad reader/administration device – DMP Model 7063/7063A, 7073/7073A, 7163/7173, 7872, 7873
- 24 • Wiegand Interface – DMP Model 734, 734N, or 734N-WIFI
- 25 • Reader – DMP Model PP-6005B, Model PR-5455, Model MP-5365
- 26 • Cards or credentials – DMP Model 1326, DMP Model 1306P, DMP Model 1346, DMP Model 1386

27 **11.4 Access Control Equipment**

28 Access Control equipment shall communicate to the system by way of the control panel keypad bus. The
29 equipment shall have a three (3) year warranty and meet or exceed features offered in the products listed
30 in Section 11 of this document.

31
32 **12.0 COMPILED DETECTION EQUIPMENT LISTING**

33 **12.1 Hard-wired**

34 Hard-wired detection equipment shall communicate to the system by way of the control panel loop
35 expansion bus. The equipment shall have a three (3) year warranty as stated in the current DMP Product
36 Catalog and meet or exceed features offered in the following products:

- 37 • Network Transient Suppressor – DMP Model 270
- 38 • Trouble Sounder – DMP Model 277
- 39 • Bus Splitter/Repeater Module – DMP Model 710
- 40 • Door Contact – DMP Model SM-20WG (surface applications – requires DMP zone expander)
- 41 • Output Expansion Module - DMP Model 716
- 42 • Graphic Annunciator Module - DMP Model 717
- 43 • Dual Phone Line Module – DMP Model 893A

44 Other product types shall connect directly to zone expansion modules such as:

- 45 • Addressable -- DMP Models 521LX, 521LXT, 850S/711, 850D/711, 2W-BLX, 2WT-BLX

- 1 • Non-Addressable - DMP Models 521B, 521-BXT, 850S, 850D
- 2 • Addressable - DMP Model 711
- 3 • Addressable - DMP Models 714, 714-8, 714-16
- 4 • Addressable - DMP Models 712-8
- 5 • Addressable - DMP Models 715, 715-8, 715-16
- 6 • Manual Fire Alarms – DMP Models 850S, 850D

7 **12.2 Wireless**

8 Wireless detection equipment shall communicate to the system by way of a compatible 900MHz receiver
 9 utilizing two-way communications, capable of receiving up to 500 wireless zones. The wireless system shall
 10 be programmed directly from the control panel, and shall not require a separate device programmer. The
 11 wireless detection equipment shall have a one (1) year warranty. It shall be capable of sending transmitter
 12 and battery status to the control panel’s compatible receiver up to once every 60 seconds and must meet
 13 or exceed the following products:

- 14 • Wireless Receiver – DMP Model 1100X-W or 1100XH-W
- 15 • Wireless Repeater – DMP Model 1100R
- 16 • Universal transmitter – DMP Model 1101-W, 1102-W
- 17 • Universal Transmitter – DMP Model 1103-W
- 18 • Universal Transmitter – DMP Model 1105-W
- 19 • Wireless Window Transmitter – DMP Model 1107-W
- 20 • Wireless Zone Expander – DMP Model 1114-W
- 21 • Wireless Relay Output – DMP Model 1116-W
- 22 • Wireless LED Annunciator – DMP Model 1117R-B or 1117R-W
- 23 • Wireless Remote Indicator Light – DMP Model 1118R-B or 1118R-W
- 24 • Wireless Door Sounder – DMP Model 1119-W
- 25 • Motion Detector – DMP Model 1121-W, 1125-W, 1126R-W, 1126C-W, 1127W-W, and 1127C-W
- 26 • Glass Break Detector – DMP Model 1129-W
- 27 • Recessed Contact – DMP Model 1131-W
- 28 • Bill Trap – DMP Model 1139-I
- 29 • Panic Transmitter – DMP Model 1142-B, 1142-W, 1142BC-B, 1142BC-W
- 30 • Pendant Panic Transmitter – DMP Model 1145-1-B, 1145-2-B, and 1145-4-B
- 31 • Smoke Detector Transmitter – DMP Model 1161-W, 1162-W
- 32 • Wireless Smoke Detector – DMP Model 1165-W, 1165H-W, 1165HS-W
- 33 • Wireless Post Indicator Valve (PIV) – DMP Model 1181-R
- 34 • Wireless Outside Screw and Yoke Valve (OS & Y) – DMP Model 1182-R
- 35 • Wireless Heat Detectors 1183-135F and 1183-135R
- 36 • Wireless Carbon Monoxide Detector 1184-W

37 **12.3 Power Supplies and Transformers**

38 Power supply and transformer shall maintain system operation. The batteries shall be checked and
 39 replaced every three to five years. The equipment shall have a three (3) year warranty as stated in the
 40 current DMP Product Catalog and meet or exceed features offered in the following products:

- 41 • Power Supply – DMP Model 505-12, 115 Vac, 12 Vdc
- 42 • Power Supply – DMP Model 505-12LX, 115 Vac, 12 Vdc
- 43 • Power Supply – DMP Model 505-12L, 12 Vdc
- 44 • Transformer - DMP Model 327, 16.5 Vac 50 VA, Plug-in
- 45 • Transformer - DMP Model 322, 16.5 Vac 56 VA, Wire-in

- 1 • Transformer - DMP Model 323, 16.5 Vac 56 VA, Wire-in
- 2 • Transformer – DMP Model 324, 16.5 Vac 100 VA, Wire-in
- 3 • Transformer – DMP Model 324P, 16.5 Vac 100 VA, Wire-in

4 **12.4 Access Control Equipment**

5 Access control equipment shall provide access control functions between the panel and controller door
6 access points. The equipment shall have a three (3) year warranty as stated in the current DMP Product
7 Catalog and meet or exceed features offered in the following products:

- 8 • Interface Module – DMP Model 734, 734N, or 734N-WIFI Wiegand Interface Module
- 9 • Egress Module – DMP Model PB-2 REX Button
- 10 • Reader – DMP Model PP-6005B Proxpoint Plus©
- 11 • Reader – DMP Model MP-5365 Miniprox©
- 12 • Reader – DMP Model MX-5375 Maxi-Prox™
- 13 • Reader – DMP Model TL-5395 Thinline II™
- 14 • Door Controller – DMP Model 1306P Prox Patch™
- 15 • Door Controller – DMP Model 1306PW Prox Patch™
- 16 • Access Card – DMP Model 1351 ProxPass© Card
- 17 • Access Card – DMP Model 1326 Proxcard II© Card
- 18 • Access Device – DMP Model 1346 Proxkey II™ Keyfob, 1386 Isoprox II©

19 **12.5 Cellular Communications Equipment**

20 Cellular Communications equipment shall plug directly into the XR150/XR350/XR550 PCB J24 connector and
21 shall be supervised by the XR150/XR350/XR550 control panel. The Cellular Communications Equipment shall
22 be of a low current draw and powered directly by the XR150/XR350/XR550 Control Communicator.
23 The Cellular Communicator shall communicate in the SDLC Serial 3 Format for communications directly to a
24 SCS-1R or SCS-VR DMP Central Station Receiver. The equipment shall have a three (3) year warranty as
25 stated in the current DMP Product Catalog and meet or exceed features offered in the following products:

- 26 • 263H Digital HSPA+ Digital Cellular Communicator
- 27 • 263C CDMA Digital Cellular Communicator
- 28 • 380-400 Level 400 SIM Card (263H only)
- 29 • 381-2 18” Coax Cable
- 30 • 381-12 12’ Coax Extension
- 31 • 381-25 25’ Coax Extension
- 32 • 383 Rubber Duck Antenna
- 33 • 386 Wall Mount Antenna Bracket
- 34 • 387-1 3DB Fiberglass Antenna w/Bracket
- 35 • 387-3 3DB MEG Antenna
- 36 • 387-4 SMA to N Cable, 4ft
- 37 • 387-25 SMA to N Cable, 25ft
- 38 • 387-50 SMA to N Cable, 50ft

40 **12.6 Z-Wave Wireless Devices**

41 The system shall be capable of 232 Z-Wave devices by means of the use of the model 738Z module. The
42 following are compatible Z-Wave devices.

- 43 • 738Z Z-Wave Module
- 44 • Z-TZEMT400BB3X Z-Wave Thermostat
- 45 • Z-45602 Z-Wave Light Control Module with Dimmer

- 1 • Z-45603 Z-Wave Light Control and Appliance Module
- 2 • Z-99100-004 Z-Wave Door Deadbolt, Polished Brass
- 3 • Z-99100-005 Z-Wave Door Deadbolt, Satin Nickel
- 4 • Z-99100-006 Z-Wave Door Deadbolt, Venetian Bronze

5

6 **13.0 INSTALLATION**

7 **13.1 System Component Installation**

8 Materials shall be installed in strict compliance with all local, state, county, province, district, federal and
9 other applicable building, safety, and fire standards, laws, codes, regulations, and guidelines including, but
10 not limited to, all appendices and amendments and the requirements of the local authority having
11 jurisdiction (AHJ).

12 **13.2 Lightning Suppression**

13 The system shall include an optional lightning suppressor module that intercepts and directs lightning,
14 transient, and RF interference to ground.

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END OF SECTION

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SECTION 31 31 16

TERMITE CONTROL

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 for substitutions.

1.2 QUALITY ASSURANCE

- A. Comply with all applicable governmental standards for use and storage of these materials. Use these chemicals for this Work only. Unauthorized use of these chemicals is strictly forbidden.
- B. Subcontractors Qualifications
 - 01 Applicator shall be bonded to perform this type of work.
 - 02 Where local licensing is available or required, applicator shall be licensed to perform this type of work.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data for all products proposed to be furnished, including copy of EPA registration and MSDS sheets.
- B. Installation Instructions: Manufacturer's recommended installation instructions, including application strengths / rates for all areas to be treated (i.e. building pad directly below slab, grade beams, etc.).
 - 01 Submit actual quantities (gallons) to be furnished for each application.
- C. Affidavit: Submit a signed affidavit immediately following application of termite treatment, attesting the specification compliance of the chemicals, their proportions, and application.

1.4 WARRANTY

- A. Warranty the Work specified herein for five years against becoming unserviceable or causing an objectionable appearance resulting from either defective or nonconforming materials or workmanship.
 - 01 The warranty shall include a one (1) year damage guarantee for repair / replacement of any damaged building materials caused by termites.
 - 02 The warranty shall include an additional four (4) year service guarantee against termite activity within the affected area.

PART 2 - MATERIALS

- A. Poison Diluent: Portable water
- B. Treatment Chemical / Products:
 - 01 Premise Pre-construction
 - 02 Other equal product containing the specified chemical(s) as approved by the Architect.

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- C. Provide color additive for a visual indication of areas treated.
- D. Only one product shall be used for all termite control treatment.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Quantities of Working Solution: Shall be as recommended by the manufacturer for this specific application.
- B. Procedures
 - 01 Notify the supervising authority before commencing work.
 - 02 Do not apply poison to soils that are excessively wet.
 - 03 Apply solution immediately prior to placing vapor barrier or waterproofing membrane.
 - 04 In the event of rain prior to placement of concrete, re-apply solution in accordance with manufacturer's specifications and recommendations.
- C. Upon completion of the entire slab-on-grade area, furnish the required affidavit and warranty.

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SECTION 32 31 19

ORNAMENTAL METAL FENCE

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 SUBSTITUTIONS

- A. Refer to Section 00 21 16 for substitutions.

1.2 WORK INCLUDED

- A. A design fabrication and installation of gates and fence including related footing for posts.
B. Sing Gate Operators and Entrapment protection.

1.3 SUBMITTALS

- A. Shop Drawings: Within four weeks of award of contract, submit:
01 Complete shop drawings for the Architect's approval.
02 Manufacturer's specifications and other data needed to prove compliance with specified requirements.
03 Manufacturer's installation instructions.
04 Samples or color charts showing manufacturer's full range of colors.
05 Post, foundation, and gate hinge details from manufacturer shall be certified by Professional Engineer licensed to practice Structural Engineering. The Engineer shall sign and seal the shop drawing for this specific installation.

1.4 REFERENCES

- A. ASTM A123 & ASTM A500

PART 2 PRODUCTS

2.1 MATERIALS

- A. Gates and fence shall be Ameristar. "Montage Industrial" product line.
01 84" tall, 3 Rail panels with standard bottom
a. Fence Panels shall be "Invincible"
b. Swing Gate Panels shall be "Invincible"
02 Posts: 6"sq.x 3/16" at gate post, line post shall be 2 1/2" x 12 ga. Min.
03 Rails: 1 3/4" x 1 3/4" x 12 ga. tubes
04 Pickets shall be 16 ga. 1" square tubing or as indicated on drawings.
05 Hinges: Heavy duty, 4 per each leaf, 5/8-inch diameter J-bolts with nuts and washers
06 Finish: Powder Coated
07 Hardware: as applicable for compatibility with swing gate openers
08 All miscellaneous components for a complete installation
- B. Gates operator and Entrapment protection. "Liftmaster" product line.
01 Model: CSW24U
a. 24VDC high traffic commercial swing gate operator
b. Operators shall be mounted to "Invincible" Gate Panels
02 Posts: 6" sq. x 3/16" at gate post, set in concrete footings
03 **Accessories: Monitored Retro-reflective photo eye and Monitored wireless edge kit. Loop Detector, and two- four button remote controls**

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- 04 Finish: Powder Coated
- 05 Hardware: as applicable for compatibility with swing gate openers
- 06 All miscellaneous components for a complete installation

- C. Manufacturers:
 - 01 Builders Fence Co.
 - 02 Ameristar (Basis of Design)
 - 03 Anchor Fence Co.
 - 04 LiftMaster (Basis of Design)
 - 05 Viking Access Systems

1 **PART 3 EXECUTION**

2

3 **3.1 INSTALLATION**

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A. Set post in reinforced concrete piers in accordance with approved shop drawings.
Manufacturer shall design piers to adequately support gates and posts.

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B. Complete installation in accordance with manufacturer's printed instructions.

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SECTION 32 84 00

IRRIGATION

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Perform work in accordance with all applicable laws, codes and regulations required by authorities having jurisdiction over such work, and provide for all inspections and permits required by Federal, State and Local authorities in furnishing, transporting and installing materials. Contractor shall be a Licensed Irrigator in the State of Texas, with all rights and privileges to perform work therein and have the minimum of five(5) years experience performing said work.
- B. All materials shall be subject to inspection and approval by Owner upon delivery for conformity to specifications. Such approval shall not impair the right of inspection and rejection during progress of the work.
- C. Substitutions of materials will not be permitted unless authorized in writing by Owner.
- D. Furnish standard products in manufacturers' standard containers bearing original labels showing quantity, analysis and name of manufacturer.
- E. Store products with protection from weather or other conditions which would damage or impair the effectiveness of the product.
- F. The Plans and Specifications are intended to be complimentary, and anything mentioned in the Specifications and not shown on the Plans, or shown on the Plans and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both. In the event of conflict between the Drawings and Specifications, it shall be brought to the attention of the Architect immediately for clarification. Large detailed drawings shall take precedence over smaller scaled drawings.
- G. The Contractor shall check all Drawings and Specifications furnished to him immediately upon their receipt, and shall promptly notify the Architect of any discrepancies therein. Measurements marked on Plans shall be followed in preference to scale measurements. The Contractor shall compare all Drawings and verify the figures before laying out the work and will be held responsible for any subsequent errors that might have been avoided by such a check. When measurements are affected by conditions already established, the Contractor shall take field measurements and notify the Architect of any deviations.
- H. Deviations from the Plans and dimensions therein given, whether or not error is believed to exist, shall be made only after authority is obtained from the Architect in writing.
- I. The Contractor shall keep at the site where the work is taking place one (1) copy of the Plans and Specifications signed and identified by the Architect, and shall at all times give the Architect and his representatives access thereto. During the course of the work, or should any errors, omissions, ambiguities, or discrepancies be found on the Plans or in the Specifications, or should there be found any discrepancies between the Plans and the Specifications to which the

1 Contractor has failed to call attention before submitting his proposal, then the Architect will
2 interpret the intent of the Plans and Specifications, and the Contractor shall abide by the
3 Architect's interpretation, and shall carry out the work in the accordance with the decision of the
4 Architect.

5
6 J. The completed system shall be fully functional and operate as indicated in the drawings &
7 specifications. Items required for preparation, but identified in these contract documents shall be
8 provided at o additional cost to the Owner.

9

10 **1.2 FINAL ACCEPTANCE**

11

12 A. When the Contractor is completely finished with all the work, all systems are in good operating
13 conditions, trenches compacted and graded level, contact Owner (48 hours notice) for a final
14 inspection. Punch list items, if any, will be faxed to the Contractor in 24 hours.

15

16 B. Work under this section will be accepted by the owner upon satisfactory completion of all work. Upon
17 final acceptance, the Owner will assume responsibility for maintenance of the work.

18

19 **1.3 SUBMITTALS**

20

21 A. Submit "As - Built" shop drawings for the irrigation system. Include **actual field measurements**,
22 piping layout and details illustrating location and types of sprinkler heads, valves, control systems and
23 wiring, and list of fittings.

24

25 B. Submit the following equipment cut sheets:

26 01 Valves, and valve access boxes, PVB

27 02 Complete brass faucet & ball valve

28

29 C. Approved equipment samples will be returned to Contractor and may be used in the work.

30

31 **1.4 PROJECT CONDITIONS**

32

33 A. Verify with General Contractor any or all known underground and surface utility lines.

34

35 B. **Protect existing trees**, plants, lawns, and other features designated to remain as part of the final
36 landscape work. Hand trench areas within 15' from trees with 10" caliper or larger.

37

38 C. Promptly repair damage to adjacent facilities caused by irrigation system work operations. Cost of
39 repairs at Contractor's expense.

40

41 D. Promptly notify the Architect of unexpected sub-surface conditions.

42

43 E. **Irrigation system shall be designed by a licensed irrigator in the state of Texas.** Exact locations of
44 piping, sprinkler heads, valves, and other components shall be established by Contractor and
45 approved by the Architect in the field at time of installation. Full coverage of all areas on the plans will
46 be required.

47

48 **PART 2 - MATERIALS**

49

50 **2.1 ACCEPTABLE MANUFACTURERS**

51

52 A. Manufacturer:

53 01 RAIN BIRD SPRINKLER MFG. CO., GLENDORA, CA.

54 02 FEBCO or approved equal

- 1 03 HUNTER INDUSTRIES, SAN MARCOS, CA.
- 2
- 3 B. Associated equipment:
- 4 01 Brass Pressure Vacuum Breaker (2 1/2") shall be made by FEBCO or RAIN BIRD, weight as
- 5 per city requirements, winter insulated by Contractor.
- 6 02 Brass Gate Valve (2") by FEBCO
- 7 03 Brass Faucet (hose bib, staked as specified)
- 8 04 Ball Valve at Faucet
- 9 05 Plastic box 9" x 12" with a green lid. Stabilize base with (4) solid bricks.

- 10
- 11 C. Plastic pipe, fittings, and connections:
- 12 01 Polyvinyl chloride pipe: ASTM D2241, rigid, schedule 40 PVC, extruded from virgin parent
- 13 material. Provide pipe homogeneous throughout and free from visible cracks, holes,
- 14 foreign materials, blisters, wrinkles, and dents.
- 15
- 16 02 PVC pipe fittings: ASTM D2241 schedule 40 PVC molded fittings suitable for solvent weld,
- 17 slip joint ring tite seal, or screwed connections. Fittings made of other materials are not
- 18 permitted.

19

20 **PART 3 EXECUTION**

21

22 **3.1 - INSPECTION**

- 23
- 24 A. Examine final grades and installation conditions. **Do not** start irrigation system work until
- 25 unsatisfactory conditions are corrected.

26

27 **3.2 - PREPARATION**

- 28
- 29 A. Layout and stake all head locations and all valve / box locations. Obtain Architect's acceptance of
- 30 layout prior to excavating.
- 31
- 32 B. Coordinate placement of sleeves with General Contractor as indicated for installation of piping.
- 33
- 34 C. This Contractor shall coordinate and/or install all power and utility connections required for
- 35 proper operation of the system.

36

37 **3.3 - INSTALLATION**

- 38
- 39 A. Excavating and backfilling:
- 40
- 41 01 Excavation shall include all materials encountered, except materials that cannot be
- 42 excavated by normal mechanical means.
- 43
- 44 a. Rock excavation: Submit a unit cost per foot of trench for rock excavation.
- 45 Include in price additional backfill materials required to replace excavated rock.
- 46
- 47 02 Excavate trenches of sufficient depth and width to permit proper handling and
- 48 installation of pipe and fittings.
- 49 03 If pulling method is used, the pipe "plow" shall be a vibratory type. Starting and finishing
- 50 holes for pipe pulling shall not exceed a 1'-0" by 3'-0"
- 51 04 Excavate to depths required to provide 2" depth of earth fill or sand bedding for piping
- 52 when rock or other unsuitable bearing material is encountered.
- 53 05 Fill to match adjacent grade elevations and then place and compact fill in layers not
- 54 greater than 6" depth adding water to remove all air pockets.

- 1 06 Install irrigation lines with a minimum cover of 12” based on finished grades.
- 2
- 3 07 Excavate trenches and install piping and partially fill during the same working day. **Do not**
- 4 leave open trenches or partially filled trenches open over night for safety of surrounding
- 5 neighborhood and students without flagging and / or barricading.
- 6
- 7 B. Plastic pipe; Fittings and Accessories
- 8 01 Install plastic pipe in accordance with manufacturer's installation instructions. Provide for
- 9 thermal expansion and contraction by **“snaking”** the pipe from side to side.
- 10 02 Make plastic to metal joints with plastic male adapters
- 11 03 Make two (2) part cleaner and glue, weld joints in accordance with manufacturer's
- 12 recommendations.
- 13 04 Allow joints to set at least 24 hours before pressure is applied to the system.
- 14 05 Provide concrete thrust blocks at all angles of the Main Line (see details).
- 15 06 Install ball valve and brass faucet staked with 3/4” steel rebar and secured with plastic
- 16 electrical ties.
- 17 07 Install additional “Tee” extended 3” and capped for future use.
- 18 08 Install PVB and accessories as required to complete the system.
- 19 09 Install in-ground gate valve at P.V.B. in a 6” valve access box.
- 20
- 21 C. Sleeves:
- 22 01 Provide new 4” sch. 40 PVC for all locations.
- 23
- 24 D. Flushing, Testing, and Adjustment
- 25 01 After sprinkler piping is installed and before quick couplers are installed, open control
- 26 vales and flush out the system with full head of water.
- 27 02 Perform system testing, as per City, upon completion of each section. Make necessary
- 28 repairs and retest-repaired sections as required.
- 29

30 **3.5 - DISPOSAL OF WASTE MATERIALS / CLEAN -UP**

- 31
- 32 A. Stockpile, haul from site, and legally dispose of waste materials, including unsuitable excavated
- 33 materials, rock, trash, and debris.
- 34
- 35 B. Perform cleaning during installation of the work and upon completion of the work. Remove from site
- 36 all excess materials, soil, debris, and equipment. Repair damage resulting from irrigation system
- 37 installation.
- 38

39 **3.6 - ACCEPTANCE**

- 40
- 41 A. Test and demonstrate to the Landscape Architect and Owner the satisfactory operation of the system
- 42 free of leaks.
- 43
- 44 B. Instruct the Owner's designated personnel, if needed, in the operation of the system.
- 45
- 46
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- 48

END OF SECTION

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SECTION 32 92 13

HYDRO MULCH SEEDING

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refer to Section 00 21 16 for substitutions.
- B. Stand of Grass: 20 growing plants per square foot.

1.2 SCOPE

- A. All improved areas including lawn, not furnished with Solid Sod

1.3 QUALITY ASSURANCE

- A. Source Quality Control: Producer's test for purity and germination of seed, dated within nine months of sowing.
- B. Comply with recommendations of "Official Method of Analysis", Association of Official Analytical Chemists.
- C. Deliver fertilizer to site in bags or other convenient containers, each fully labeled conforming to applicable State fertilizer laws, and bearing name, trade name or trademark, and warranty of producer.
- D. Do not perform seeding when wind exceeds 15 MPH, or when excessively wet or dry.
- E. Restrict foot and vehicular traffic from seeded areas after planting to end of established period.
- F. Immediately after seeding, erect barricades and warning signs as required to protect seeded areas from traffic until grass is established.

1.4 SUBMITTALS

- A. Test Reports: Results of seed purity and germination tests.
- B. Certificates: Manufacturer's certification that materials meet specification requirement.

1.5 WARRANTY

- A. Provisional Acceptance: Planting reviewed as being in accordance with specifications.
- B. Guarantee Period: Guarantee stand of grass for 90 days after provisional acceptance.

1.6 CONTRACTOR'S MAINTENANCE

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- A. The Contractor's maintenance of new sodding / hydro-mulch areas shall consist of watering, cultivating, weeding, mowing at least once every two weeks, and furnishing and applying such sprays and invigorates necessary to keep sodding / hydro-mulch free from insects and diseases, and in thriving condition and mowing of entire site until the Owner contractually takes possession of the site or until the planting density / requirements have been met, whichever is later.
- B. Protect sodding / hydro-mulch areas at all times against damage of all kinds for the duration of Maintenance Period. Any plants damaged or injured, because sufficient protection was not provided, shall be treated or replaced by the Contractor, as directed by Owner, at no additional cost to the Owner.
- C. See following maintenance frequency schedule.

MAINTENANCE FREQUENCY SCHEDULE

Mowing, Edging, Trimming, Litter Clean Up, and Irrigation Monitoring:

<u>Month</u>	<u>Number of Visits Per Month (minimum)</u>
January	2
February	2
March	4 (Start up irrigation system)
April	4
May	5
June	4
July	5
August	5
September	5
October	3
November	2 (Shut down irrigation system)
December	2

- 01 Top Dress Fertilizer: Thirty (30) days after seeding and/or sodding.
- 02 Weeding and Weed Control: As required at each visit.
- 03 Reseeding And/or Re-sodding: As required upon notice.

1.7 FINAL ACCEPTANCE

- A. Work under this section will be accepted by the Owner upon satisfactory completion of all work, including maintenance, but excluding replacement of plant material under the warranty period. Upon final acceptance, the Owner will assume responsibility for maintenance of the work.
- B. Grass / Sodding shall be sound, healthy and vigorous. All areas shall be free from disease, insect pests, eggs, or larvae and shall have healthy, well-developed root systems. They shall be free from physical damage or adverse conditions that would prevent thriving growth.
- C. Hydro-mulch sodding shall be deemed acceptable to transfer to the Owner when it meets the above conditions and additionally has achieved a minimum 95% coverage of all areas

1 to which it was applied. All areas shall remain the responsibility of the Contractor until
2 this condition is met.

3
4 **PART 2 - PRODUCTS**

5
6 **2.1 MATERIALS**

7
8 A. Seed

9
10 All seed must meet the requirements of U.S. Department of Agriculture Rules and
11 Regulations as set forth in Federal Seed Act and Texas Seed Law. Type of seed, purity and
12 germination requirements, rate of application and planting dates are as follows:

13
14 Application Rate: Pounds per 5000 SF, 10 lbs

15 Type: Hulled Common Bermuda

16 Planting Date: April 15 to Oct 1

17
18
19 B. Fertilizer

20
21 Fertilizer shall be water soluble with analysis of 15 percent nitrogen, 15 percent phosphoric
22 acid, and 15 percent potash. Rate of application shall be 750 pounds per acre, except during
23 the period of April 15 thru September 1, when the rate shall be reduced to 600 pounds per
24 acre.

25
26 C. Hydroseed mixture shall include wood fiber, specifically made for hydroseeding, mixed with
27 water. Mix wood fiber according to manufacturer's specifications. Rate of application shall
28 be 3,000 pounds per acre.

29
30 **PART 3 - EXECUTION**

31
32 **3.1 INSPECTION**

33
34 A. Check that preceding work affecting ground surface is completed.

35
36 B. Verify that soil is within allowable range of moisture content.

37
38 C. Soil is to be free of weeds and foreign material immediately before seeding.

39
40 **3.2 HYDRO-MULCHING**

41
42 A. Preparation

43 01 After designated areas have been completed to lines, grades and cross-sections
44 shown on drawings, perform seeding.

45 02 Cultivate areas to be seeded to depth of 4-inch minimum.

46 03 Cultivate seed-bed sufficiently to reduce soil to state of good tilth; seed-bed shall
47 be deemed in state of good tilth when soil particles on surface are small enough
48 and lie close enough together to prevent seed from being covered too deep for
49 optimum germination.

50 04 Cultivation of seed-bed will not be required in loose sand where depth of sand is 4
51 inches or more.

52 05 Maintain cross-section previously established throughout process of cultivation; do
53 any necessary reshaping prior to any planting of seed.

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- B. Location
 - 01 As noted in Paragraphs 1.5 and 2.1, A.

- C. Application
 - 01 Mow existing weeds as close as possible and disc 3 -4 inches to prepare seed bed.
 - 02 Perform seeding as described in Section 2.01, A.
 - 03 Seeding which is extended beyond most favorable planting season for species designated shall be done only when conditions are favorable, or when alternate or corrective measures have been taken.
 - 04 Cultivated area or seed-bed shall have relatively smooth surface without ruts or tracks.
 - 05 Hydraulically spray slurry on ground to form a blotter-like ground cover uniformly impregnated with grass seed. This application will allow absorption of moisture, thus allowing rainfall or mechanical watering to percolate to underlying soil.
 - 06 Roll area with cultipacker for optimum seed to soil contact.
 - 07 Accomplish application of mulch slurry immediately upon completion of final tillage.
 - 08 Apply fertilizer and mulch as described in Section 2.01, A.
 - 09 Keep mulch moist by daily application of water (if necessary), for a minimum of ten days or until the seeds in the mulch have germinated and rooted in soil.

3.3 MAINTENANCE

- A. The hydro mulch seeding shall be adequately watered until established. Any areas damaged by erosion or areas that do not have an acceptable turfing shall be redone to the satisfaction of the Architect.
- B. Maintenance Period
 - 01 Maintain new seeding for 90 days from time of provisional acceptance.
 - 02 Reseed during this period.
 - 03 Repair damage to other plants or lawns during maintenance period.
 - 04 Seed, water, and mow as specified.
- C. Ten days before end of maintenance period, notify Architect for inspection.

3.4 CLEANING

- A. Remove barriers and signs from project site at termination of establishment period.
- B. Avoid overspray of slurry to all finished materials and surfaces, no don't allow overspray on building wall finishes, walks, site features, etc.

END OF SECTION

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SECTION 32 94 00

LANDSCAPING

CONDITIONS OF THE CONTRACT AND DIVISION 1, as indexed, apply to this Section.

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Perform work in accordance with all applicable laws, codes and regulations required by authorities having jurisdiction over such work, and provide for all inspections and permits required by Federal, State and Local authorities in furnishing, transporting and installing materials.
- B. Plants shall be subject to inspection and approval by Owner upon delivery for conformity to specifications. Such approval shall not impair the right of inspection and rejection during progress of the work.
- C. Substitutions of plant materials will not be permitted unless authorized in writing by Owner.
- D. The Contractor shall be solely responsible for the safe transportation of plants to the site, and for the condition of each plant upon arrival. Trees damaged, dehydrated, or abused during transit and storage will be rejected.
- E. The Owner may inspect any phase of this operation and may reject any plant material improperly handled during any phase of this operation.
- F. Furnish standard products in manufacturers' standard containers bearing original labels showing quantity, analysis and name of manufacturer.
- G. Store products with protection from weather or other conditions which would damage or impair the effectiveness of the product.

1.2 CONTRACTORS MAINTENANCE

- A. The Contractor's maintenance of new planting shall consist of watering, cultivating, weeding, mulching, re-staking, tightening and repairing guys, resetting plants to proper grades or upright position, restoring the planting saucer and furnishing and applying such sprays and invigorates necessary to keep plants free from insects and diseases, and in thriving condition and mowing of entire site until three months (3) after substantial completion.
- B. Protect planting areas and individual plants at all times against damage of all kinds for the duration of Maintenance Period. Any plants damaged or injured, because sufficient protection was not provided, shall be treated or replaced by the Contractor, as directed by Owner, at no additional cost to the Owner.
- C. See following maintenance frequency schedule.

1 **MAINTENANCE FREQUENCY SCHEDULE**

2
3
4 **Mowing, Edging, Trimming, Litter Clean Up, and Irrigation Monitoring:**

5
6

<u>Month</u>	<u>Number of Visits Per Month</u>
7 January	2
8 February	2
9 March	4 (Start up irrigation system)
10 April	4
11 May	5
12 June	4
13 July	5
14 August	5
15 September	5
16 October	3
17 November	2 (Shut down irrigation system)
18 December	2

19
20

21 Top Dress Fertilizer: Thirty (30) days after seeding and/or sodding.

22
23 Mulching, Weeding, Weed Control and Guying Adjustment: As required at each visit.

24
25 Reseeding And/or Resodding: As required upon notice.

26
27 **1.3 FINAL ACCEPTANCE**

- 28
29 A. Work under this section will be accepted by the Owner upon satisfactory completion of
30 all work, including maintenance, but excluding replacement of plant material under the
31 warranty period. Upon final acceptance, the Owner will assume responsibility for
32 maintenance of the work.
33
34 B. Plants: Plants shall be nursery grown in accordance with good horticultural practices
35 under climatic conditions similar to those of the project for at least two (2) years. Unless
36 specifically noted otherwise, all plants shall be exceptionally heavy, symmetrical, tightly
37 knit, so trained or favored in development and appearance as to be superior in form,
38 number of branches, compactness and symmetry.
39
40 C. Plants shall be sound, healthy and vigorous, well branched and densely foliated when in
41 leaf. They shall be free from disease, insect pests, eggs, or larvae and shall have healthy,
42 well-developed root systems. They shall be free from physical damage or adverse
43 conditions that would prevent thriving growth.
44
45 D. Plants shall be true to species and variety and shall conform to measurements specified,
46 except that plants larger than specified may be used. Use of such plants shall not increase
47 Contract price.
48
49 E. When container stock is specified, it shall have grown in the container in which it is
50 delivered for at least six (6) months, but not over two (2) years. Samples must prove that
51 no root bound conditions exist. No container plants that have cracked or broken balls of
52 earth when taken from container shall be planted, except upon special approval by the

1 Owner. Container stock shall not be pruned before delivery. Field grown plants recently
2 transplanted into containers shall not be accepted.

- 3
4 F. Trees that have damaged or crooked leaders, or multiple leaders, unless specified, will be
5 rejected. Trees with abrasions of the bark, sunscalds, disfiguring knots, or freshly cut
6 limbs over 3/4 inches that have not completely calloused, will be rejected.

7
8 **PART 2 - MATERIALS**

- 9
10 A. Fertilizer:
11 01 Trees - Agriform 20-10-5 formula 21 gram tablets.
12 02 Plant Beds - Agriform 20-10-5 formula 21-gram tablets.
13
14 B. Staking Material: The Contractor shall use staking materials meeting the specifications,
15 subject to the approval of the Owner. Suggested materials:
16 01 Wire - new #12 gauge, pliable, galvanized.
17 02 Hose-garden type of 2-ply reinforced rubber.
18
19 C. Pre-Emergent Weed Control in areas of Woody Ornamental Plants shall be Eptam or
20 Eptam-5-G as manufactured by Greenlight Products Company, San Antonio, Texas 782117
21
22 D. Root Stimulator: Hi-yield root stimulator 5-12-3 (manufacturer's recommendation)
23
24 E. Mulch shall be Shredded Pine Bark, the product of standard stripping of bark from pine
25 trees for timber or pulp manufacturing. The mulch shall be free of debris and of particles
26 over 1 inch in diameter, provided by LETCO.
27
28 F. Peat Moss shall be a domestic product consisting of ninety-eight percent (98%) partially
29 decomposed organic material of natural occurrence. It shall be clean and free of mineral
30 matter. Peat shall have a minimum of 35% moisture content at the time of incorporation
31 into the soil.
32
33 G. Water shall be furnished by the Owner after Substantial Completion. Hoses and other
34 watering equipment shall be furnished by the Contractor.
35
36 H. Chemical Additives: If determined necessary by soil tests, ph shall be maintained at 6.5 to
37 7.5.
38

39 **PART 3 - INSTALLATION**

- 40
41 A. Layout plants in locations shown on drawings. Stake location of each tree and outlines of
42 shrub and ground cover beds.
43
44 B. Excavate 18 inches for all planting, as hereinafter specified.
45
46 C. Subsoil shall not be worked when moisture content is so great that excessive compaction
47 will occur, nor when it is so dry that clods will not break readily. Water shall be applied, if
48 necessary, to bring soil to an optimum moisture content for tilling and planting.
49
50 D. Tree pits - See Plan Spec.
51
52 E. Notify the Owner in writing of all soil or drainage conditions the Contractor considers
53 detrimental to growth of plant materials.

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- F. If rock, hardpan, underground construction work, tree roots or other obstructions are encountered in the excavation of plant pits and beds, alternate locations may be selected by the Owner. Where locations cannot be changed, submit cost required to remove obstructions to a depth of not less than 6 inches below the required pit or bed depth. Proceed with work after approval.
- G. Canned stock shall be removed carefully after cans have been cut on two sides with approved cutter. Do not use spade to cut cans. Do not lift or handle container plants by tops, stems or trunks at any time.
- H. Do not bind or handle any plant with wire or rope at any time to avoid damage to bark or broken branches. Lift and handle plants only from bottom of ball.
- I. At Contractor's option and expense, spray all evergreen or deciduous plant material in full leaf immediately before digging with anti-desiccant applying an adequate film over trunks, branches, twigs and foliage.
- J. Fill tree pits and beds with soil mix to compacted depth to receive plant root ball so top of root ball is 2 inches above finished grade.
- K. Scarify the walls and bottom of all tree pits and beds immediately prior to the placement of plant and backfill mix.
- L. Evenly distribute agriform tablets in plant pits two-thirds, backfilled, at the rate of one tablet per 1/2 inch caliper or per 1 foot of height, whichever is less.
- M. Smooth planted areas to conform to specified grades after full settlement has occurred. Contractors shall bear final responsibility for proper surface drainage of planted areas. Any discrepancy in the drawings or specifications, obstructions on the site or prior work done by another party, which the Contractor feels precludes establishing proper drainage, shall be brought to the attention of the Owner in writing. Failure to issue such notification establishes full responsibility for landscape drainage upon the landscape Contractor.
- N. Form saucer with 3 inches high berm of plant mix around trees 24 inches wider than the ball diameter.
- O. Water all plants immediately, again, after planting.
- P. Apply pre-emergent weed control material in areas to receive mulch.
- Q. Spread mulch in required area to the compacted depth of 2 inches.
- R. Fill all shrubs and ground cover beds with plant mix to 2 inches above finished grade (compacted).
- S. Planting:
 - 01 Excavate in planting mix for individual plant and install as required. Set plant plumb and brace rigidly in position until planting soil mix has been tamped solidly around the ball and roots.
 - 02 When tree pits and beds have been backfilled approximately two-thirds full, place Agriform tablets evenly distributed in plant pits according to the following schedule:

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- 1 gallon equivalent - 1 tablet
- 5 gallon equivalent - 2 tablets
- 03 Water thoroughly, saturating root ball, before installing remainder of the planting soil to top of pit; climate all air pockets. Top of root ball shall be 2 inches above finished grade.
- 04 Smooth planting areas to conform to specified grades after full settlement has occurred. The Contractor shall bear final responsibility for proper surface drainage of planted areas.
- 05 Water all plants immediately, again, after planting.
- 06 Apply pre-emergent weed control material over entire area to receive mulch.
- 07 Mulch all shrub and ground cover beds with shredded bark 2 inches thick.

T. Surface Drainage of Planting Areas: The Contractor shall bear final responsibility for proper surface drainage of planted areas. Any discrepancy in the drawings or specifications, obstructions on the site, or prior work done by another party, which Contractor feels precludes establishing proper drainage, shall be brought to the attention of the Owner, in writing, for correction or relief of said responsibility.

U. Prune containerized plants only at time of planting, according to standard horticulture practice, to preserve the natural character of the plant. Prune by removing entangled branching and by removing crotches. Avoid removing branch tips wherever possible.

Remove all dead wood, suckers and broken or badly bruised branches. Use only clean, sharp tools.

V. Staking of trees shall be done by the Contractor, who is responsible for material remaining plumb and straight for all given conditions through the guarantee period.

- 01 Staking shall be completed immediately after planting. Plants shall stand plumb after staking.
- 02 Drive all stakes to a sufficient depth (2 foot min.), and with sufficient firmness to maintain position so that they will not pull out or be displaced by stresses from wind or other natural causes.
- 03 Encase wires in hose, to prevent direct contact with the bark, and place them around the trunk in a single loop.

W. Clean up all areas as required for complete and acceptable inspection.

- 01 Make written request for inspection after planting operations are completed.
- 02 Submit requests for inspections to the Owner at least two (2) days prior to anticipated inspection date.

END OF SECTION

SECTION 21 13 13 - FIRE PROTECTION SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

- A. Provide all piping and equipment shown on the drawings, and all accessories necessary for a complete operating system.
- B. Systems and installation shall comply with the requirements of City Fire Marshall, applicable NFPA codes, FM/UL approving agencies and the State Board of Insurance requirements.
- C. Sprinkler piping shall not be installed over electrical panels, electrical/technology equipment or transformers. Sprinkler piping shall not be installed beneath HVAC equipment under any circumstance or adjacent to HVAC equipment where it restricts full service access to equipment.
- D. All piping through walls (interior and exterior) shall be sleeved with Schedule 40 galvanized piping and sealed per Detail on Plumbing Drawings. All piping through fire walls shall be fire-caulked.
- E. Where areas beneath stairs or above ceilings are enclosed, fire sprinkler protection shall be provided as required by Code.
- F. All sprinkler piping shall be manufactured in the United States of America by Bull Moose Tube, Wheatland Tube or Allied Tube. All piping shall be labeled by manufacturer along entire length of pipes. Labeling shall indicate SIZE, CLASS, MATERIAL SPECIFICATION, NAME OF MANUFACTURER and COUNTRY OF ORIGIN. Piping not properly labeled by manufacturer with the information listed above will be removed from site and replaced at no cost to Owner. Piping and fittings shall be protected at all times. Piping and fittings resting directly on the ground is NOT acceptable. Provide temporary end caps and end closures on all piping and fittings. Piping found unprotected will be replaced by the Contractor at no additional cost to Owner.
- G. Provide pipe markers and valve tags per Section 22 05 53 of the Specifications.
- H. Fire Sprinkler System shall be included in the Coordination Drawings. See Section 22 01 00 of the Specifications.

PART 2 - MATERIALS AND METHODS

- 2.01 GENERAL: Engage the services of a sprinkler subcontractor who will perform detailed hydraulic calculations and system design to meet the design requirements as noted on the drawings. The subcontractor shall also furnish and install all equipment and piping according to his approved design. He shall provide all labor, scaffolding and equipment necessary for the performance of this work. ***Sprinkler Contractor shall have a Licensed Engineer (State of Texas) on staff to perform their fire sprinkler system design and hydraulic calculations. Sprinkler Contractor's Engineer shall be the Engineer of Record for the fire sprinkler system.***
- 2.02 SCOPE OF WORK:
- A. The connection to the water main, fire vault and associated backflow preventer, isolating valves, supervisory switch, fire department connection and post indicating valve, and piping to the building are specified on the civil engineering drawings.
 - B. In location shown on drawings, install system riser including O S & Y valve, check valve, alarm valve, water motor alarm, retarding chamber and, water flow sensor. Where code authority requires, provide wall mounted PIV's for each fire sprinkler zone/system. Provide fire department test valves at appropriate places with approval of the Engineer. Piping for test valves shall not be exposed in any location unless in a mechanical room.
 - C. Install new fire sprinkler system with sprinkler branch piping and sprinkler heads in all areas of the shop building. Only the shop building will be fire sprinklered.
 - D. All fire sprinkler piping and equipment shall be labeled for identification according to the following requirements:
 - 1. Data/Name plates shall be installed in accordance to Fire Prevention Bureau Standards.
 - 2. Piping shall be identified in mechanical rooms, unfinished spaces without ceilings, above suspended lay-in acoustical ceilings, and crawl spaces for the type of service and direction of flow.
 - 3. All fire prevention equipment shall be identified with data/name plates.
- 2.03 EQUIPMENT AND MATERIALS:
- A. SPRINKLERS: Provide concealed sprinkler in all areas with ceilings. Install chrome plated, upright type in mechanical rooms or other rooms with no ceiling. Similar style, extended coverage or quick response heads are also acceptable. All sprinkler heads installed in ceiling tile shall be centered in the tile. Provide heavy-duty American-Time model G2036 (no substitutions) red metal guard to protect sprinkler heads from abuse or tampering in high-risk areas on all exposed heads including in mechanical and electrical rooms. Upright heads shall be chrome plated, brass construction and installed a minimum of 6" below overhead structure, ducts, etc. Fusible links shall have a temperature rating of a minimum of 50° F normal ambient temperature, 145° F minimum.
 - B. ALARM VALVES: UL approved alarm check valve complete with necessary trimmings, including electric alarm bell as shown on the drawings. Provide supervising switch on interior O S & Y valves for fire alarm interconnection.

- C. VALVES AND DEVICES: All sprinkler control valves, alarm check valves, check valve and accessories shall be UL listed and FM approved. 2" and smaller shall be bronze, rising stem, inside screw with solid wedge. Larger valves shall be iron body, bronze trim, rising stem, OS&Y with solid wedge. Check valves shall be cast iron flanged body, bronze fitted, non-slam type. Acceptable manufacturers include Nibco, Tyco, Grinnell, Stockham and Victaulic.
- D. PIPING BELOW GRADE: UL/FM listed PVC Class 200 water pipe installed in accordance with the manufacturers recommendations. Provide tracer wire for all underground piping with leads located in accessible area.
- E. PIPING ABOVE GRADE: Schedule 40 or heavier, black steel with screwed or Victaulic joint complying with NFPA 13. Thinwall pipe is not acceptable. For every sprinkler head (including end of line sprinkler head), tap main/branch pipe serving each individual sprinkler head on top of pipe to prevent trash from collecting at head. Main or branch pipe shall extend 24" beyond the last sprinkler head tap. For all sprinkler heads except upright type, install swing joint (hard pipe return bend) over to sprinkler head location. Flexible sprinkler head connections are NOT ALLOWED. All sprinkler heads installed in ceilings shall be centered in tile. Saddle taps are not acceptable. Where piping is exposed such as in stairwells it shall be installed tight to structure and a minimum of eight feet above the floor. All piping shall be manufactured in the United States by Bull Moose Tube, Wheatland Tube or Allied Tube.
- F. FITTINGS: Threaded for 2" and smaller and schedule 40 steel with grooved fittings for sizes larger than 2". Threaded fittings shall be Class 150, malleable iron, manufactured in USA (Anvil is an acceptable manufacturer). Grooved fittings shall be Schedule 40 steel joined with Victaulic style 005,07, 75 or 77 couplings and Grade "E" gaskets. For outlet fittings, Victaulic reducing couplings and outlet couplings shall NOT be used - use welded outlet fittings (Anvil is an acceptable manufacturer). Welded joints on pipe runs shall be made with continuous welds and with pipe ends beveled BEFORE fabrication. A hole cutting tool shall be used (Do NOT burn holes in pipe). All fittings shall be UL listed and FM approved for fire sprinkler systems. Flexible sprinkler head connections are NOT ALLOWED.
- G. MISCELLANEOUS PIPING: Piping exposed to view outside such as drain and test piping shall be chrome plated and installed so as not to be a pedestrian hazard or stain building.
- H. SIGNS, LABELS AND IDENTIFICATION: Furnish metal signs in accordance with NFPA 13. Provide placards on all control valves, alarm lines, alarm test lines, floor control valves, area control valves, inspector test valves and auxiliary drain locations. Valves, etc. above ceiling or in walls to be provided direct access and the location conspicuously noted by a permanent placard indicating the type of device and the zone it covers. Provide a zone map, mounted in an extruded metal frame with protective plexi-glass cover mounted at the sprinkler zone valve header. Map shall indicate which zone valve controls which portion of the building as well as the location of all system drain and test valves. Label each valve with lamacoid, printed signs ("Inspector's test", "Main Drain", etc.). Map shall reflect the actual room numbers indicated in the final approved graphics package.
- I. ACCEPTABLE PIPING MANUFACTURERS: Bull Moose Tube, Allied Tube, Wheatland Tube, American Tube. All piping and fittings shall be manufactured in the United States.
- J. ACCEPTABLE ACCESSORY MANUFACTURERS: Grinnell, Reliable, Tyco, Victaulic and Viking (All equipment such as retarding chamber, valves, sprinkler heads, alarms and similar items shall be from the same manufacturer.)

2.04 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8". Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than two feet horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion. Un-insulated copper piping shall be wrapped with gas wrap tape at each hanger (minimum 2" beyond hanger), and supports shall be hot dipped copper clad or plastic covered. Vertical pipe shall supported per the manufacturers recommendations.

B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

<u>Pipe Size</u>	<u>Steel Pipe</u>	<u>Other Pipe</u>
1" & Smaller	6 Feet	4 Feet
1¼" & 1½"	8 Feet	5 Feet
2"	8 Feet	5 Feet
2½" to 4"	8 Feet	6 Feet
6" and Larger	8 Feet	6 Feet

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8". Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. Concrete anchors shall not be used.

3. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

- SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.
- MULTIPLE RUNS: Trapeze hangers.
- BEAM CLAMPS: Grinnell Figure 92 for smaller pipe
- BEAM CLAMPS: Grinnell Figure 228 (storm or sanitary 8" and larger)

4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced. Unless described by detail on the drawings, provide Tolco Pipe Pier Supports four foot on center to support piping on the roof. Select for proper weight loading.

5. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel.

6. PIPE SADDLES: Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16" minimum length. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.

7. SWAY BRACING: Piping shall be braced as necessary to prevent excessive movement of pipe due to water flow.

2.05 SYSTEM TESTING

- A. All underground piping shall be thoroughly flushed in accordance with NFPA 13 and 24. The flush test shall be witnessed by the proper governing authority.
- B. All underground piping shall be hydrostatically tested at 200 psi for a period of two hours. Comply with NFPA 13 and 24.
- C. All above ground piping shall be hydrostatically tested at 200 psi for a period of two hours. All piping, valves and sprinkler heads shall be water tight.
- D. Provide inspector's test connection at the required test points. Provide and install AGF model 1000 test and drain. Drain/test valves shall be located out in the system piping, not at the building service entrance. Locate all drain/test stations in mechanical rooms. All drain/test stations shall be clearly shown by subcontractor on design drawings submitted to Owner and LTY for approval. Failure to show drain/test station locations will result in immediate rejection of submittal without further review.
- E. All testing shall be subject to the guidelines outlined in 22 00 00 – General Plumbing, Paragraph 1.24 – MEP INSPECTIONS section of the Specifications.

- 2.06 SPARES: Provide sprinkler box with a minimum of 12 spare sprinkler heads. Provide an assortment of head types in proportion to those types installed with a minimum of two of each type. Include sprinkler head wrench to fit each type head installed.

- 2.07 GUARANTEE: All materials and installation shall be guaranteed for one year from Owner's acceptance.

2.08 SUBMITTALS:

- A. Submit equipment, hydraulic design calculations and layout drawings for approval. Hydraulic Calculations and Layout Drawings shall be sealed and signed by the Licensed Engineers (State of Texas) on staff with the fire sprinkler contractor that performed the design and calculations. These drawings shall be approved by the applicable state and insuring agencies. Alternately, contractor may submit design drawings for preliminary approval prior to submitting to governing agencies. After agency approval, resubmit to architect for final approval.
- B. Submittal drawing shall show the location of ductwork, mechanical equipment above the ceiling, ceiling devices, and other items that may cause conflict with sprinkler piping and sprinkler heads. Drawings shall indicate height of pipes not in mechanical rooms, and any pipe that cannot be installed above 8 feet shall be highlighted. Piping shall be coordinated with ductwork contractor and may require relocation due to mechanical/plumbing ductwork and piping constraints.
- C. Submittal drawing shall show the location of all drain and test valves and piping discharge.

- D. Provide a printed sheet giving brief instructions relative to all necessary aspects of sprinkler controls and emergency procedures next to sprinkler riser mains. Instruction shall be protected by glass or a transparent plastic cover. Provide zoning map of building framed and mounted at fire sprinkler riser.
- E. Approval of these submittals shall not be construed as releasing the contractor from compliance with the contract Documents. They are a means of coordinating the work and aiding in the proper selection and installation of equipment. Do not release items such as fire dampers and starters until associated equipment or ductwork drawings are approved. All materials and equipment shall be subject to final acceptance by the Engineer at the completion of construction and adjustments of the system.
- F. If a submittal is returned to the Contractor marked "Rejected" or "Revise and Resubmit", only one (1) additional submittal will be permitted without the Contractor incurring charges for the additional re-submittals. LT&Y shall be reimbursed by the Contractor for any expense in connection with any necessary submission in addition to the two (2) submissions allowed. Contractor will be billed by LT&Y a flat rate of \$1,000 plus any additional expenses for each re-submittal that is in addition to the two (2) submissions allowed.

2.09 RECORD DRAWINGS AND CALCULATIONS

- A. During the course of construction, the Contractor shall revise their design drawings and calculations to reflect any changes which are made. At completion of job, updated Design Drawings and Hydraulic Calculations that have been signed and sealed by the Contractor's design engineer shall be included in the Operations and Maintenance Manual that the Contractor provides for the Owner when the project has been completed. Record drawings shall include exact installed locations of all piping, sprinkler heads, zone valves and drain/test valves. See Section 22 00 00 of the Specifications for additional requirements.
- B. Provide zoning map of building framed and mounted at fire sprinkler riser.

2.10 PAINTING: All equipment exposed to view shall have a painted finish. All piping exposed to view, including in mechanical rooms, shall be painted red with two coats of industrial, epoxy enamel paint.

2.11 CONSTRUCTION PHASING

- A. Phasing of construction shall be the sole responsibility of the General Contractor. Construction phasing shall accommodate all needs and schedules required by the Owner. All costs for construction shall be included in the price submitted by the Contractor on the bid date. No additional money will be approved for the Contractor or their sub-contractors to accommodate costs (including labor) associated with construction phasing.

END OF SECTION

SECTION 22 00 00 - GENERAL PLUMBING

1.1 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. Drawings and Specifications are intended to be complimentary. Any work exhibited in either of them whether in the other or not, is to be executed according to true intent and meaning thereof, the same as if set forth in all. Should any work required by the drawings and specifications be in violation of any Federal, State, County or City laws, ordinance or regulation, those laws and regulations shall prevail, and shall be complied with by the Contractor as a part of this work with no extra compensation.
- B. The drawings are schematic in nature, but show the various components of the system approximately to scale and indicate how they are to be integrated with other parts of the building. Determine exact locations by close coordination with the Owner's Representative, job measurements, determining the requirements of other trades and reviewing all contract documents. The Drawings indicated general routing of the various parts of the systems, but do not indicated all fittings, offsets and runouts which are required. The Contract includes these items as required to fit the system into spaces allotted for them.
- C. Equipment that is scheduled is the basis of the design, and have been coordinated for space, installation and electrical requirements. Space, installation and electrical requirements for other equipment and models from acceptable manufacturers have not been verified or coordinated. Contractor shall verify these requirements prior to using other equipment in his bid and include any additional costs for installation of the equipment. This includes general construction and MEP costs.

1.3 PERMITS AND FEES

The contractor shall obtain and pay for all permits and licenses, file all notices, pay all legal fees and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work specified or shown on the drawings. This applies to Federal, State and Local Codes and Requirements. Approval to the various insuring and inspection authorities shall also be obtained. Refer to Architectural sections for additional information.

1.4 GUARANTEE

All materials, apparatus and equipment furnished and installed under this Section of these Specifications shall be new and free from any defects when accepted by the Owner and shall be guaranteed in writing for a period of one year from the date of acceptance by the Owner unless noted to have extended warranties.

1.5 COOPERATION

The Contractor shall cooperate with other trades on the job and make installations in the proper sequence during the construction of the buildings, and he shall notify the Architect well in advance of construction of all interference of his work with that of other trades and of building construction. This notification shall not relieve the contractor of his responsibilities.

1.6 VISITING THE SITE

The Contractor shall be familiar with the Drawings and Specifications and shall have examined the premises and understand the conditions under which he will be obligated to operate in performing the contract. No allowance shall be made consequently for any error through negligence in this regard.

1.7 WORKMANSHIP

All work shall be performed in a neat workmanlike manner and in the best practice of the trade. Only workmen skilled in the trades shall be employed to perform the work included in these specifications.

1.8 MATERIALS

- A. Materials, when not otherwise definitely specified, shall conform to applicable National Specifications and Standards. All materials shall be certified to not contain any asbestos or other material banned by the Environmental Protection Agency. Lead shall not be used in any material, pipe or solder in contact with the domestic water system.
- B. The names of manufacturers and model numbers have been used in the Contract Documents to establish type of equipment and standard of quality. Where only one name is mentioned for a particular item of material, then that manufacturer is the only one acceptable. Where several names are mentioned, any one of those listed may be furnished provided submittal contains sufficient information to show complete compliance with contract Documents. No attempt has been made to determine if each manufacturer listed will produce material that will comply with all requirements of this project or will fit the allotted space; if they do, then it will be acceptable.
- C. Requests for substitution during the bidding period, in accordance with the requirements of the Special Conditions, must be accompanied by a complete product submittal with all features, accessories and capacities noted. Large equipment must include a 1/4" scale drawing showing how the equipment and required access space are compatible with the available space. Acceptance for bidding does not waive the post bidding requirement for formal submittal and approval.

1.9 REMOVAL OF RUBBISH AND CLEAN-UP

Keep area of operations free from accumulation of waste material or rubbish at all times. At the completion of the work, remove all rubbish, tools, scaffolding and surplus materials from the area of operations. The exposed parts of the Mechanical installation which are to be painted shall be thoroughly cleaned of cement, plaster, grease, oil spots and other materials in preparation for painting. All piping shall be cleaned of cement, plaster and other construction debris prior to being concealed above accessible ceilings or being insulated. Clean exposed piping prior to final inspection. All construction areas shall be left "broom" clean on a daily basis. Prior to final acceptance, vacuum clean all mechanical rooms including equipment.

1.10 LUBRICATION

After the installation is completed, lubricate all moving parts of all equipment furnished under this Division of the Specifications requiring same. Leave with the Owner a brief but complete set of lubrication instructions, showing the recommended frequency of lubrication and the type of lubricant recommended for each piece of equipment.

1.11 NOISE AND VIBRATIONS

The Contractor shall guarantee that the entire system and its component items of equipment, as installed by him, shall operate without objectionable vibration or noises, as determined by the Architect. If, in the opinion of the Architect, objectionable vibration or transmission thereof to the building occurs, the Contractor shall execute such remedial measures as are necessary to eliminate such unsatisfactory operating conditions and the material and labor thereby required shall be performed at the Contractor's expense.

1.12 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. ELECTRICAL: Power wiring is specified in the Electrical Section. Interlock and control wiring (any voltage) is specified under this Section. Controllers and starters, unless part of a motor control center, are specified under this Section.
- B. PAINTING OF EQUIPMENT, PIPING AND ACCESSORIES: Painting Section. However, all items furnished under this Section shall be kept clean and free from corrosion.
- C. OPENINGS: Various Sections. However, the locations of all inserts and openings shall be determined under this Section and coordinated with other Sections in ample time to avoid cutting new construction.
- D. CUTTING, PATCHING AND FURRING: Various Sections. However, the locations of all inserts and openings shall be determined and coordinated with other sections.
- E. EQUIPMENT AND PIPING SUPPORTS: Refer to structural drawings, details and notes for specific support and pipe hanging requirements. Specific loading and attachment methods shall be followed to assure that individual structural members are not overloaded.

1.13 GENERAL EQUIPMENT REQUIREMENTS

Manufacturer's printed directions shall be followed for preparing, assembling, installing, erecting and cleaning manufactured materials or equipment, unless otherwise directed.

1.14 SHOP DRAWINGS

- A. Submit seven complete sets of shop drawings checked and certified by the contractor as being checked, and lists of materials furnished under this Division. Shop drawings shall be approved before installation of the material under consideration.

B. Shop Drawings shall consist of published ratings of capacity data, detailed construction drawings, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings and other pertinent data. Where the literature is submitted covering a group or series of similar items, the item under consideration shall be clearly indicated. Shop drawing shall list VOC of materials. Materials with VOC levels higher than LEED and code requirements will be rejected. Drawings shall be submitted showing revisions to equipment layouts due to use of alternate or substitute equipment. The front sheet of each copy of the submittal shall have the following typed information:

1. Job name and location.
2. General Contractor's name, address, Project Manager's name and telephone number.
3. Submitting Sub-contractor's name, address, Project Manager's name and telephone number.
4. Suppliers company name, address, salesman's name and telephone number.
5. Signature of an officer or attorney-in-fact of the Sub-contractor with date and title and a statement that the submittal materials and equipment complies with the Contract Documents.

Any submittal without all of the above information will be rejected without review.

C. Equipment that has regional representation shall only be supplied by the regional representative that serves the area where the project is located. The regional representative's name and signature shall be included with the shop drawing.

D. Shop Drawings are required for but are not limited to the following items:

Plumbing Carriers, Drains & Cleanouts	Water Heaters
Piping Insulation	Plumbing Fixtures & Equipment
Pipe Markers and Valve Tags	Plumbing Pipe, Valves & Fittings

E. Approval of these submittals shall not be construed as releasing the contractor from compliance with the contract Documents. They are a means of coordinating the work and aiding in the proper selection and installation of equipment. Do not release items such as fire dampers and starters until associated equipment or ductwork drawings are approved. All materials and equipment shall be subject to final acceptance by the Engineer at the completion of construction and adjustments of the system.

F. If a submittal is returned to the Contractor marked "Rejected" or "Revise and Resubmit", only one (1) additional submittal will be permitted without the Contractor incurring charges for the additional re-submittals. Lee Truong & Yu Engineers (LT&Y) shall be reimbursed by the Contractor for any expense in connection with any necessary submission in addition to the two (2) submissions allowed. Contractor shall pay LT&Y \$500 for review of EACH additional submission beyond the two (2) submissions allowed. For shop drawing submittals beyond the two (2) submissions allowed, a \$500 cashier's check shall be included with such submittals or LT&Y will not review the submittal. For fire sprinkler shop drawings, see Section 21 13 13 for more stringent requirements.

1.15 PROTECTION OF EQUIPMENT

- A. Do not deliver equipment to jobsite until progress of construction has reached the stage where equipment is actually needed, or until building is closed in enough to protect equipment from the weather. Equipment allowed to stand in weather will be rejected, and Contractor is obligated to furnish new equipment at no cost to Owner.
- B. Adequately protect equipment (including all Owner-furnished items) from damage after delivery to job. Cover with heavy cloth as required to protect from damage.
- C. Equipment which has been damaged by construction activities will be rejected. Contractor shall furnish new equipment at no cost to Owner.

1.16 CUTTING AND PATCHING

Coordinate the work with other trades to arrange for all holes, chases, and other spaces necessary for the installation of all components of the mechanical systems. Inform the other trades in ample time for these to be provided. Failure to comply with this requirement may necessitate cutting and patching work. If such work becomes necessary, it will be done under this Section of the specifications, and shall conform to all applicable requirements of other Sections of the Specifications.

1.17 STRUCTURAL STEEL

All structural steel used for the purpose of fabricating pipe supports, pipe guides, pipe anchors, equipment supports, and framing for large ducts and plenums, shall conform to ASTM Designation A-36. All steel used for these purposes shall be new, clean, straight and galvanized.

1.18 CONCRETE PADS

All equipment mounted on the floor shall have a concrete house keeping pad. Concrete pads shall be sized for the equipment to be supplied. Pad shall exceed base dimensions by approximately 4" all around. Reinforce pads rebar including #4 bar around perimeter. Tool pad to form chamfered edge. Nominal thickness shall be 4". Refer to details for outdoor equipment.

1.19 SPARE PARTS LISTS, OPERATING INSTRUCTIONS

At completion of job, furnish three copies of spare parts lists and operating instructions for all equipment furnished under this Division. These lists and instructions shall be published by the manufacturer of the equipment and shall be in good condition. Bind in 3-ring binder with project name.

1.20 TOOLS AND SPARE PARTS

Upon completion of the installation, deliver to the Owner all tools and spare parts that are furnished by the Equipment Manufacturer for use with the equipment furnished under this Contract.

1.21 RECORD DRAWINGS

- A. Maintain at the job site a separate set of white prints (blue line or black line) of the contract drawings for the sole purpose of recording the "as-built" changes and diagrams of those portions of work in which actual construction is at variance with the contract drawings. Mark the drawings with a colored pencil. Prepare, as the work progresses and upon completion of work, reproducible drawings clearly indicating locations of various lines, valves, ductwork, traps, equipment, and other pertinent items, as installed. Include flowline elevation of sewer lines. Record existing and new underground and under slab piping with dimensioned locations and elevations of such piping.
- B. At the conclusion of project, obtain without cost to the Owner, erasable mylars of the original drawings and transfer as-built changes to these. Prior to transmittal of corrected drawings, obtain 3 sets of blueline prints of each drawing, regardless of whether corrections were necessary and include in the transmittal (2 sets are for the Owner's use and one set is for the Architect/Engineer's records). Delivery of these as-built prints and reproducibles is a condition of final acceptance. Provide record drawings on one set each (reproducible Dayrex mylar film positives) and AutoCad 2000 files on disk (CD Rom).
- C. As-Built drawings should indicate the following information as a minimum:
 - 1. Indicate all addendum changes to documents.
 - 2. Remove Engineer's seal, name, address and logo from drawings.
 - 3. Mark documents RECORD DRAWINGS.
 - 4. Clearly indicate: DOCUMENT PRODUCED BY
 - 5. Indicate all changes to construction during construction. Indicate actual routing of all piping, ductwork, etc. that were deviated from construction drawings.
 - 6. Indicate exact location of all underground plumbing and flow line elevation.
 - 7. Indicate exact location of all underground plumbing piping and elevation.
 - 8. Indicate exact location of all underground electrical raceways and elevations.
 - 9. Revise schedules to reflect (actual) equipment furnished and manufacturer.
 - 10. During the execution of work, maintain a complete set of drawings and specifications upon which all locations of equipment, ductwork, piping, devices, and all deviations and changes from the construction documents in the work shall be recorded.
 - 11. Location and size of all ductwork and mechanical piping above ceiling including exact location of plumbing isolation valves.
 - 12. Exact location of all electrical equipment in and outside of the building.
 - 13. Fire Protection System documents revised to indicate exact location of all sprinkler heads and zone valves.
 - 14. Exact location of all roof mounted equipment, wall, roof and floor penetrations.
 - 15. Cloud all changes.

1.22 OWNER'S INSTRUCTIONS

Provide four hours of instruction to the Owner's designated personnel upon completion of the system's installation.

1.23 ALTERNATES

- A. Determine the scope of each specified alternate proposal by carefully reading all Divisions of the Documents. The Bid Form contains information explaining the extent of the construction to be performed under a specific alternate. Alternate proposals, which are not predominantly mechanical in scope, are described in other Divisions of these Documents. Pay particular note to re-roofing items that may necessitate adjustments to existing piping.

- B. Alternative Equipment: Certain types of equipment as listed below require the specified brand and model to be included in the base bid. At the contractor's option, he may propose equivalent equipment from one of the listed alternate manufacturers for one or more of these types of equipment. The contractor shall list in this alternate bid the name of the item, manufacturer's name, model number and the amount to be deducted from his base bid.

1.24 MEP INSPECTIONS

- A. Contractor shall formally request inspections from LT&Y to review any and all MEP installations. Inspections shall include but not be limited to: pipe tests, underground installations prior to backfill, rough-in installations, wall cover inspections, above ceiling inspections, final inspection. Owner and City shall also be included in inspection requests; however, approval of installation by Owner or City does NOT absolve the Contractor of the required inspection and approval of all Plumbing installations by LT&Y nor take the place of the required inspection and approval of all Plumbing installations by LT&Y.
- B. Information required from Contractor on each and every request for inspection is as follows:
 - 1. Specific type of test (i.e. hydrostatic test, etc.).
 - 2. Exact location of test (i.e. area of building with room numbers, riser number for sanitary waste / vent plumbing tests, etc.).
 - 3. Description of test (i.e. partial inspection, walls only, chase walls, wall cover, ceiling cover, etc.)
 - 4. Exact time test started (required test time per Project Manual will need to have elapsed prior to LT&Y inspection). Estimated time test will start will not be acceptable.
 - 5. Pressure reading on gauge at time of request for all pipe tests (provide picture of gauge with request).
 - 6. Verification from General Contractor with name of person that verified, that specific test has been verified by the Contractor and all sub-contractors to meet all requirements of the Specifications and Codes (prior to inspection request).
- C. Contractor shall provide a MINIMUM of 48 hour notice prior to requested inspection time, no exceptions.
- D. INSPECTION REPORTS: After each inspection, LT&Y will generate an inspection report and distribute promptly. The Contractor will then be given 7 working days from date of report to address all deficiencies listed on the report. The GENERAL CONTRACTOR shall verify that all items on each inspection report have been addressed by their subcontractors in this time period. Once verified the GENERAL CONTRACTOR shall sign-off on each deficiency listed on the report and return the signed-off copy of the inspection report to LT&Y via e-mail. After the signed-off report is returned to LT&Y, the GENERAL CONTRACTOR shall request a re-inspection by LT&Y to close the report. If after 7 working days no re-inspection is requested by the GENERAL CONTRACTOR to close a report, LT&Y reserves the right to re-inspect whenever our schedule allows, with these re-inspections still being subject to Paragraph E below.

- E. TEST REJECTIONS AND RE-INSPECTIONS: If a test is rejected or a re-inspection of an issued LT&Y Inspection Report is found to NOT be completely addressed, only ONE (1) additional inspection will be permitted without the Contractor incurring charges for each additional inspection required. LT&Y shall be reimbursed \$500 by the GENERAL CONTRACTOR for expenses in connection with EACH inspection in addition to the two (2) inspections allowed. For inspections beyond the two (2) allowed inspections, a \$500 cashier's check shall be provided at the time of each additional inspection or LT&Y will not perform the inspection.

1.25 DEMOLITION AND REMODELING

- A. In areas of demolition, contractor shall remove all plumbing equipment, fixtures, drains, piping and devices not to be reused. Any material that has salvage value shall be offered to the Owner, and if accepted, delivered to his warehouse. If not accepted it shall be properly disposed of with the other construction debris.
- B. Where existing systems serve other areas as well, they shall remain active in those areas. Cap, patch and relocate piping, etc. to keep systems operable.
- C. Remove and replace ceilings, walls, floors and other finishes as necessary to install or modify plumbing systems.
- D. Where ceilings are to be removed or replaced, remove and reinstall existing plumbing items where necessary.
- E. Relocate piping as necessary to allow new or modified construction. Repair existing plumbing systems damaged by construction activities.
- F. Where large equipment is to be replaced (water heaters, storage tanks, water softeners, etc.), ensure that equipment that is an acceptable manufacturer but not the scheduled brand will fit the available space and can be installed through existing doors, louvers or windows, prior to using this equipment in the bid.
- H. Where new cold or hot water piping connects to the existing system, system may require partial or complete draining of water. Include the costs of shutdown, drainage, cleaning, refilling and chlorination of the system.
- I. Where existing equipment is modified or replaced and interfaces with the Energy Management System, disconnect and reconnect EMS wiring, and replace end devices and sensors as necessary.

1.26 CONSTRUCTION PHASING

- A. Phasing of construction shall be the sole responsibility of the General Contractor. Construction phasing shall accommodate all needs and schedules required by the Owner. All costs for construction shall be included in the price submitted by the Contractor on the bid date. No additional money will be approved for the Contractor or their sub-contractors to accommodate costs (including labor) associated with construction phasing.

END OF SECTION

SECTION 22 05 53 – IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 - MATERIALS AND METHODS

2.1 PIPE MARKING

- A. Identify all new system piping. Use Opti-Code Brady pressure sensitive adhesive pipe markers consisting of pipe marker and direction of flow arrow tape. Background colors of markers, arrows and tape of each type of pipe system shall be of appropriate legend and background color to meet all ANSI/OSHA/ASME standards, complete with direction arrow. Select appropriate size for O.D. of piping including insulation. Clean pipe PRIOR to installation of pipe markers. Markers or arrows not wrapping the full circumference of the pipe shall be tie wrapped in place, otherwise taped at each end around full circumference of pipe. Provide minimum 2-1/4" letters through 4" pipe and 4" letters for piping larger than 4". For exterior piping or piping inside mechanical rooms, provide Snap-Around pipe markers up to 4" pipe and Strap-Around pipe markers for piping larger than 4".
- B. Apply markers as follows:
1. At input and output of each piece of equipment inside building.
 2. At each valve not in a mechanical room.
 3. At every point a pipe enters or exits a wall or floor (both sides of wall or floor).
 4. At intervals not exceeding 20 feet.
 5. Any location where view is obstructed.
- C. These markers shall conform to OSHA and ANSI A 13.1 Codes. Arrow markers must have same ANSI background colors as their companion pipe markers and wrap completely around pipe with 3" overlap.
- D. Pipe markers and arrow markers shall be provided as follows:
1. Domestic Cold Water
 2. Domestic Hot Water including tempered water
 3. Domestic Hot Water Return including tempered water return
 4. Sanitary Sewer
 5. Vent Piping
 6. Roof Drain Leader
 7. Natural Gas Piping
- E. MANUFACTURER PIPE LABELING: All piping shall be labeled by manufacturer along entire length of pipes. Labeling shall indicate SIZE, CLASS, MATERIAL SPECIFICATION, NAME OF MANUFACTURER and COUNTRY OF ORIGIN. Piping not properly labeled by manufacturer with the information listed above will be removed from site and replaced at no cost to Owner.

2.2 EQUIPMENT MARKING

- A. GENERAL: Each piece of plumbing equipment shall be suitably marked with the name as listed on the plans. Name shall be prominently displayed so it may be easily located and read after equipment installation. Pumps may be marked on adjacent piping.
- B. The following equipment shall be marked with lamacoid nameplate, 2" high letters:
 - 1. Water Heaters
- C. The following equipment shall be marked with laminated engraved plastic nameplate with 1.25" high letters, fastened with epoxy or screws:
 - 1. Circulator Pumps

2.3 VALVE MARKING

- A. Each valve, except those located adjacent to the equipment they serve, shall have a tag of .heavy-gauge 1½" diameter brass, stamped and engraved in black with the valve number and service symbol. Attach tag to the valve handle with a chain of similar gauge and material.
- B. On the "As Built" Drawings, mark the symbol and number of all valves, exactly as the valves are tagged.
- C. Furnish a valve schedule properly identifying the valve number and service with the exact location, the material within the pipe and the room numbers or area that the valve serves. This schedule shall be furnished on reproducible film suitable for reproduction on an ozlid machine.
- D. Provide one valve schedule, as above, installed in aluminum frame with lexan shield, and mount on wall of main equipment room.

2.4 PAINTING

- A. GENERAL: All piping or insulation on piping exposed to view shall be painted. Insulated pipe with required metal jacket shall not be painted. All above grade gas piping shall be painted.
- B. PAINT TYPE: Industrial grade, high gloss enamel over suitable primer. Provide two finish coats.
- C. COLOR CODING: (Verify with Architect prior to painting)
 - 1. Gas Piping Yellow

END OF SECTION

SECTION 22 07 19 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Install all insulation in conformance with manufacturer's recommendations and these specifications.
- B. All interior adhesives and sealants must meet VOC limit requirements of South Coast Air Quality Management District (SCAQMD) Rule #1168. Must comply with the TIPS requirements.
- C. All interior paints and coatings must meet VOC limit requirements of South Coast Air Quality Management District (SCAQMD) Rule #1113 and Green Seal GS-11 and GS-03. Must comply with the TIPS requirements.
- D. Insulation materials manufactured by the following list of companies will be acceptable provided their materials conform to these specifications (see Paragraph on Substitution): Armstrong, CertainTeed, Childers, Foster, Knauf, Koolphen, Manville, Owens-Corning and Pittsburg-Corning.
- E. Flame Spread and Smoke Requirements:
 - 1. All jackets, adhesives, coatings, insulating materials and vapor barrier mastics for piping and equipment shall have a flame spread not higher than 25 and smoke developed rating not higher than 50.
 - 2. All materials containers shall have a U. L. Label.
- F. At each pipe support point, provide formed 16 gauge galvanized sheet metal saddle, with length three times pipe size, 8" minimum. Sheet metal saddle shall be secured to pipe insulation using aluminum band at both ends of saddle. For piping 1½" and larger, install a hard section of Koolphen K phenolic foam pipe insulation, with length three times pipe size, minimum 8" length, on lower 180° of piping, 360° if clamps are used on top of pipe, same thickness as adjacent insulation, to prevent compression at support bearing area. Seal and finish to match adjoining insulation.
- G. Install .020" thick aluminum jacket with minimum 2" overlap joint on all insulated piping exposed outside building. Install factory made aluminum covers on all elbows. Cut aluminum neatly to fit all tees, such that all insulation is covered by aluminum. Use waterproofing aluminum colored Foster 95-44 or Childers CP-76-1 sealer to seal all joints. Provide .020x3/4" aluminum bands not more than 12" on center for all jacketing. Install aluminum covers on insulated pipe inside that is exposed to view in finished areas including inside gymnasiums, shop areas, areas and any areas with partial or no ceilings. Cover is not required in mechanical or AHU rooms. Jacketing in contact with soil shall be .010" stainless steel.

PART 2 - MATERIALS AND METHODS

2.1 DOMESTIC COLD WATER PIPING

- A. Insulate all water piping outside and above grade, in exterior walls, within eight (8) feet of exterior walls, inside concrete block walls (not including 6" or deeper chase walls), central mechanical and boiler room piping, piping inside the building but outside the building insulation (i.e. above insulation on ceiling), in basements and all unconditioned spaces and all piping subject to condensation with 1" thick factory molded fiberglass pipe covering, density not less than 3 pounds per cubic foot, conductivity (k) not higher than .25 at 100° mean temperature difference with factory attached fire retardant, vapor barrier jacket. Piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.
- B. For piping outside including pipe entry to building at grade and backflow preventers, provide 1" thick Molded Koolphen K phenolic foam pipe insulation. Install .010" stainless steel protective jacket from building wall to 6" below grade. Insulation and jacketing for backflow preventers shall be installed with easily removable sections to allow periodic servicing, testing and inspection of backflow preventer without damaging insulation installation or integrity.
- C. Install insulation over pipe and carefully connect self sealing laps. Provide 3" butt strips at each joint between sections, sealed with Foster 85-75 or Childers CP-82 adhesive. Coat all vapor retarder film (ASJ) longitudinal and butt joints with anti-fungal Foster 30-80AF vapor barrier coating to prevent moisture ingress. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils. Apply Foster 95-50 or Childers CP-76 insulation joint sealant in phenolic insulation longitudinal and butt joints to prevent moisture ingress.
- D. Insulate fittings with pre-molded cover of same materials and thickness as pipe covering. Field fabricated, mitred fittings will not be accepted. Coat all fittings and elbows with anti-fungal Foster 30-80AF vapor barrier coating and reinforcing mesh. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils.

2.2 DOMESTIC HOT WATER AND TEMPERED WATER PIPING

- A. Insulate all hot water supply and return piping, including tempered water and booster heater piping, with factory molded pipe covering made from glass fibers; 1" thick with density not less than 3 pounds per cubic foot; conductivity (k) not higher than .25 at 100° mean temperature difference; with factory attached fire retardant jacket. Piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.
- B. Install insulation over pipe and carefully connect self sealing laps. Provide 3" butt strips at each joint between sections, sealed with Foster 85-75 or Childers CP-82 adhesive. Coat all vapor retarder film (ASJ) longitudinal and butt joints with anti-fungal Foster 30-80AF vapor barrier coating to prevent moisture ingress. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils. Apply Foster 95-50 or Childers CP-76 insulation joint sealant in phenolic insulation longitudinal and butt joints to prevent moisture ingress.

- C. Insulate fittings with pre-molded cover of same materials and thickness as pipe covering. Field fabricated, mitred fittings will not be accepted. Coat all fittings and elbows with anti-fungal Foster 30-80AF vapor barrier coating and reinforcing mesh. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils..

2.3 STORM DRAINAGE PIPING ABOVE SLAB

- A. GENERAL: Insulate horizontal and vertical piping including roof drain bodies. Overflow drains and piping are included in this specification. All piping above grade shall be insulated.
- B. MATERIALS: 1½" thick flexible fiberglass blanket with vapor barrier or 1" thick fiberglass pipe insulation with vapor barrier.
- C. EXECUTION: Seal vapor retarder laps with white Foster 85-75 or Childers CP-82 and staple at 4" on center. Vapor seal staples with Foster 30-80AF. Provide 3" butt strips at each joint between sections and seal as above. Install vapor stop every 15'-0" using Foster 30-80AF. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils. Piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.

2.4 SANITARY DRAIN PIPING ABOVE GRADE

- A. GENERAL: Insulate horizontal piping, floor drain bodies, elbow at drain, first elbow that turns down and all piping in ceiling plenums of sanitary system serving floor and hub drains receiving condensate from air conditioning and refrigeration equipment.
- B. MATERIALS: 1½" thick flexible fiberglass blanket with vapor barrier or 1/2" thick pipe insulation with vapor barrier. Insulated piping exposed to view shall be insulated with pipe insulation.
- C. EXECUTION: Seal vapor retarder laps with white Foster 85-75 or Childers CP-82 and staple at 4" on center. Vapor seal staples with Foster 30-80AF. Provide 3" butt strips at each joint between sections and seal as above. Install vapor stop every 15'-0" using Foster 30-80AF. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils. Piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.

2.5 DRINKING FOUNTAIN DRAIN LINES

Insulate from connections to fountains to connection to next larger size drain, or, if drain runs into floor, from fountain to floor, with 1/2" thick pipe covering the same as for Domestic Cold Water Piping.

2.6 LAP AND JOINT ATTACHMENT

Self-sealing type jackets will be acceptable provided the laps are sealed per the manufacturers recommendations and the installation is 100% visually inspected by the insulation contractor's foreman.

END OF SECTION

SECTION 22 11 11 – NATURAL GAS PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping shown underground shall be buried a minimum of 12 inches to top of pipe. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space. Provide unions, flanges and shutoff valves to allow removal of the equipment and its subassemblies.
- B. Piping shall be concealed in wall, chases and above ceilings except in the vicinity of equipment. All materials shall conform with the requirements of the local code authority.
- C. All below grade non-metallic, non-conducting pipe not under building slab shall have a tracer wire installed parallel to pipe. Tracer wire shall be a 14 gage, solid copper wire with PVC jacket with all joints and splices sealed water-tight. Carry end of wire up through slab and terminate in an accessible location. Provide identification label attached to wire.
- D. All piping, fittings and valves shall be manufactured in the United States of America. Acceptable pipe manufacturers are Anvil, Bullmoose Tube, National Tube, Republic, Wheatland and Youngstown. Other domestic manufacturers will be considered for approval.
- E. Provide pipe markers, pipe painting and valve tags per the Specifications, Section 22 05 53.

PART 2 - METHODS

2.1 EXCAVATION AND BACKFILLING

- A. **GENERAL:** Provide all excavation and backfilling required for the proper installation of all underground piping and other components installed below grade.
- B. **EXCAVATION:** Trench with ladder type trenching machine. Make trenches 6" wider than outside diameter of pipe. Excavate, backfill and grade trench bottom.

C. BACKFILLING:

1. Backfill for pipe in City Property must comply with City requirements.
2. For non-drainage lines backfill with approved backfill material to 95% standard proctor, by hand compaction.

2.2 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8". Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than two feet horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion.

B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

Pipe Size	Steel Pipe
1" & Smaller	6 Feet
1¼" & 1½"	8 Feet
2"	8 Feet
2½" to 4"	8 Feet
6" and Larger	8 Feet

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8". Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. Do not use concrete anchors.

3. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

- a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.
- b. BEAM CLAMPS: Grinnell Figure 92 for smaller pipe

4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.

5. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel. Provide hot dipped copper clad supports for copper piping.

2.3 VALVE INSTALLATION

Ball valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve.

2.4 TESTING GAS PIPING SYSTEMS

- A. GENERAL: All new and existing gas piping shall be tested and repaired as required for safe operation and the passing of the Texas Railroad Commission requirements.
- B. GAS PIPING TESTING
1. Preliminary gas test as required by Code, but a minimum test pressure of 50 PSIG held for not less than eight hours without noticeable drop.
 2. Test joints with a soap solution while lines are under pressure. Repair any leaks that are detected.
 3. Final gas test shall be with a 24 inch column of mercury or a diaphragm gauge with a minimum dial size of 3.5 inches with a set hand and a pressure range not to exceed 20 PSIG with 2/10 pound increments. The minimum test pressure shall be not less than 10 PSIG and the maximum pressure shall not exceed 12 PSIG. The test shall be observed by the Owner's Representative AND LT&Y for a minimum of 30 minutes with no drop in pressure.
 4. Perform gas piping test as required by the Texas Railroad Commission and submit completed Texas Pipeline Safety Form PS-86B.
 5. Provide a copy of the gas pressure test reports in the Operations & Maintenance Manual provided at closeout.
- C. FINAL TEST: Subject each piping system to its normal operating pressure and temperature for not less than twenty-four hours. The piping systems must remain absolutely tight during this period. The satisfactory completion of any test or series of tests will not relieve the contractor of responsibility for ultimate proper and satisfactory operation of piping systems and their accessories.

2.5 SLEEVES

Provide sleeves for all piping passing through walls, floors not on grade and roof slabs. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Provide vented sleeves for all gas piping below floor slabs or paved areas. Pipes through grade beams shall be sleeved per structural engineer's drawings. As a minimum pipe shall be wrapped with 1" thick closed cell pipe insulation.

2.6 PLATES

Provide chromium plated wall and ceiling plates for all exposed piping, at point piping passes through walls or ceilings. Plates shall be large enough to completely cover pipe sleeves. On insulated piping, inside diameter of plates shall just exceed outside diameter of pipe covering. Plates may be omitted for pipe sizes larger than 6".

2.7 VALVE AND FITTING SIZES

All hand valves, fittings and other piping accessories shall be size of the line in which installed unless specifically indicated otherwise on the Drawings.

2.8 DIELECTRIC UNIONS

Provide dielectric insulating unions at all connections between dissimilar metals, except at final fixture connections, such as galvanized pipe connection to brass water faucet.

2.9 FITTINGS

A. SCREWED: Conform to ANSI Specification B16.3.

2.10 VALVES AND DEVICES

A. GENERAL: All pressures shown below are minimum working pressures.

B. GAS VALVES:

1. GAS VALVES: Ball type ANSI B16.33-1981, ANSI B16.38-1978 or UL 842-1980 approved and rated at the gas pressure of application. Nibco T-580-70-UL
2. SMALL GAS COCKS: Nibco T-585-70-UL
3. UNIONS: Brass insert, ground joint
4. SPECIAL VALVES: As indicated on the Drawings.

C. ACCEPTABLE MANUFACTURERS: Milwaukee, Hammond and Nibco

PART 3 - MATERIALS

3.1 NATURAL GAS, OUTSIDE BUILDING

A. GENERAL: Gas utility company will provide and install metering equipment for 5 psi service pressure. Extend piping from meter to building and install pressure reducing valve at building. Provide grounding per NFPA 70.

B. MATERIALS:

1. ABOVE GROUND: Schedule 40 black steel, ASTM ERW A-53, Grade B or ASTM A106, with Class 150 malleable iron screw type fittings. Welded joints shall be used for piping 2½" and larger. Final connections at rooftop HVAC equipment shall be hard piped (no flex connections).
2. BELOW GRADE: Polyethylene gas piping conforming to ASTM D2513, installed per manufacturer's requirements. Install minimum #14 copper wire in trench with pipe for locating purposes. Install X-Truecoat type schedule 40 steel pipe for the last five feet before exiting ground. Install dielectric union after piping exits the ground. Piping shall have socket heat fusion joints and fittings. For pipe sizes 1.5-2", piping shall be SDR-11. For pipe sizes 3-4", piping shall be SDR-11.5. Piping shall be manufactured by Performance Pipe by Conoco Phillips or JM Eagle.
- C. TESTING: As required by Code but minimum test pressure of 50 PSI held for not less than 24 hours without noticeable drop. Test all joints with a soap solution while lines are under pressure. Provide test tee in pipe at meter and downstream of building pressure reducing station. Reference Paragraph 2.4 – Testing Gas Piping Systems. Testing requirements shall meet requirements listed in Paragraph 2.4.

- D. SLEEVES: Install pipe in vented sleeves when passing under roads, driveways, parking lots and similar areas. Sleeves shall be Schedule 40 PVC below grade and Schedule 40 galvanized steel otherwise. Install vent in a manner to prevent entry of rainwater, insects or foreign objects.
- E. PAINTING: All gas piping outside shall be painted with two coats of industrial grade, yellow epoxy paint.

3.2 NATURAL GAS, INSIDE BUILDING

- A. GENERAL: Extend gas to all fixtures, appliances and equipment as required.
- B. MATERIALS ABOVE GRADE: Schedule 40 black steel, ASTM ERW A-53, Grade B or ASTM A106 with Class 150 malleable iron screw type fittings. Welded joints shall be used for piping 2½" and larger and for piping in inaccessible locations (i.e. inside walls or above inaccessible ceilings). All bolts, nuts and all thread used in the piping system and components shall be cadmium plated to resist rust. Final connections at low pressure appliances shall be corrugated flexible brass connections with epoxy coating, complying with ANSI ANS-Z21-24-1981, minimum pressure rating of 1/2 PSI.
- C. MATERIALS BELOW GRADE: Do not install piping below grade.
- D. INSTALLATION:
 - 1. Do not install any gas piping in unventilated spaces including inside walls, unless totally encased with airtight sleeving. Sleeving shall be all metallic construction, welded or screwed black steel, Schedule 10 or heavier. Sleeves shall be vented as shown on the Drawings. Gas piping installed inside casework chases shall be sleeved. Sleeve shall extend outside casework chase into normal casework for venting purposes.
 - 2. Provide an all brass lever handle gas cock in an accessible location branch line at each individual piece of gas consuming equipment.
 - 3. Branch connections to gas consuming equipment shall be size indicated on the Drawings up to points immediately adjacent to equipment. Do not reduce to size of equipment until immediately adjacent to equipment.
- E. TESTING: As required by Code but minimum test pressure of 50 PSI held for not less than 24 hours without noticeable drop. Test all joints with a soap solution while lines are under pressure. Reference Paragraph 2.4 – Testing Gas Piping Systems. Testing requirements shall meet requirements listed in Paragraph 2.4.
- F. PAINTING: All gas piping shall be painted with two coats of industrial grade, yellow epoxy paint.

3.3 GAS PRESSURE REGULATORS:

- A. Size for full connected load, with stop valves on both inlet and outlet connections.
- B. Equip with internal relief valve to vent full capacity if regulator fails wide open. Extend full size vent without reduction to the outside.
- C. Provide weather and bug proof screening on vent.
- D. Select orifices for inlet pressures established by gas company serving the building, and for outlet pressures as required to serve the proper pressure at the items of equipment being supplied.

- E. Outlet pressure shall be field adjustable.
- F. Capacities as indicated in Schedule plus 10%.
- G. Unit shall conform to latest published ANSI Code.
- H. ACCEPTABLE MANUFACTURERS: Sensus, American Meter Company, Equimeter, Fisher and Rockwell

END OF SECTION

SECTION 22 11 16 – DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping shown underground shall be buried a minimum of 12 inches to top of pipe. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space. Provide unions, flanges and shutoff valves to allow removal of the equipment and its subassemblies without having to remove excessive amounts of building piping or drain water systems.
- B. Piping shall be concealed in wall, chases and above ceilings except in the vicinity of equipment such as water heaters. Hot water shall be piped to left hand side of plumbing fixtures as user faces fixture. All materials shall conform with the City Building Code.
- C. All piping, fittings and valves shall be manufactured in the United States of America.
- D. Provide pipe markers and valve tags per Section 22 05 53 Identification of Plumbing Piping and Equipment.

PART 2 - METHODS

2.1 EXCAVATION AND BACKFILLING

- A. GENERAL: Provide all excavation and backfilling required for the proper installation of all underground piping and other components installed below grade.
- B. EXCAVATION: Trench with ladder type trenching machine. Make trenches 12" to 18" wider than outside diameter of pipe. Excavate, backfill and grade trench bottom.
- C. BACKFILLING:
 - 1. Backfill for pipe in City Property must comply with City requirements.
 - 2. For non-drainage lines backfill with approved backfill material to 95% standard proctor, by hand compaction.
- D. SAFETY SYSTEMS: Refer to Architectural Sections for additional requirements.

2.2 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8". Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than two feet horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion. Un-insulated copper piping shall be wrapped with gas wrap tape at each hanger (minimum 2" beyond hanger). Vertical copper piping shall have a minimum on one intermediate support if over five feet.

B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

<u>Pipe Size</u>	<u>Steel Pipe</u>	<u>Other Pipe</u>
1" & Smaller	6 Feet	4 Feet
1¼" & 1½"	8 Feet	5 Feet
2"	8 Feet	5 Feet
2½" to 4"	8 Feet	6 Feet
6" and Larger	8 Feet	6 Feet

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8". Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. Do not use concrete anchors.

3. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

- a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.
- b. MULTIPLE RUNS: Trapeze hangers.
- c. BEAM CLAMPS: Grinnell Figure 92 for smaller pipe
- d. BEAM CLAMPS: Grinnell Figure 228 (storm or sanitary 8" and larger)

4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.

5. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel.

6. PIPE SADDLES: Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16" minimum length. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.

C. PLUMBING CHASE PIPING: Plumbing piping located in chases and at individual fixtures not located at chases shall be rigidly supported and aligned using the Sumner Pipe Support and Alignment System, Hubbard Holdrite System or Unistrut with U-bolts and pipe clips.

2.3 VALVE INSTALLATION

Ball and butterfly valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve. Provide access panels of adequate size for concealed valves. All valves above a ceiling shall be installed within 24" of the ceiling. All valves shall be located such that there is NO OBSTRUCTION for accessing or operating valve.

2.4 CLEANING DOMESTIC WATER PIPING

Flush thoroughly, sterilize with chlorine solution for minimum 24 hours, then flush clean. Strength of chlorine solution, minimum dosage 50 ppm, and methods must comply with local Code and Health Authorities. At completion, there must be no discernible odor. System shall be flushed afterwards until remaining chlorine content is less than 0.2 ppm. Post warnings until sterilization is complete.

2.5 TESTING PIPING SYSTEMS

- A. GENERAL: Test all piping systems to assure that they are absolutely leak free. Pipe to be insulated shall be proved leak free before pipe is concealed. LT&Y to witness and approve all testing. If piping is concealed prior to LT&Y witnessing and approving testing, contractor shall expose entire piping system and re-test piping for LT&Y to witness and approve.
- B. PRESSURE TEST METHOD: Hydraulically test (no air testing allowed) domestic water piping with a minimum test pressure of 150 psig. Maintain pressure for 8 hours. During this test period, inspect all pipe fittings and accessories in the piping and eliminate all leaks.
- C. FINAL TEST: Subject each piping system to its normal operating pressure and temperature for not less than twenty-four hours. The piping systems must remain absolutely tight during this period. The satisfactory completion of any test or series of tests will not relieve the contractor of responsibility for ultimate proper and satisfactory operation of piping systems and their accessories.

2.6 SLEEVES

Provide sleeves for all piping passing through walls, floors not on grade and roof slabs. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Provide vented sleeves for all gas piping below floor slabs or paved areas. Pipes through grade beams shall be sleeved per structural engineer's drawings. As a minimum pipe shall be wrapped with 1" thick closed cell pipe insulation.

2.7 PLATES

Provide chromium plated wall and ceiling plates for all exposed piping, at point piping passes through walls or ceilings. Plates shall be large enough to completely cover pipe sleeves. On insulated piping, inside diameter of plates shall just exceed outside diameter of pipe covering. Plates may be omitted for pipe sizes larger than 6".

2.8 VALVE AND FITTING SIZES

All hand valves, fittings and other piping accessories shall be size of the line in which installed unless specifically indicated otherwise on the Drawings.

2.9 DIELECTRIC UNIONS

Provide dielectric insulating unions at all connections between dissimilar metals, except at final fixture connections, such as galvanized pipe connection to brass water faucet.

2.10 FITTINGS

COPPER: Conform to ANSI Specification B16.22.

2.11 VALVES, STRAINERS AND DEVICES

- A. GENERAL: All pressures shown below are minimum working pressures. Provide memory stops for valves used for throttling service.
- B. GATE VALVE FOR PLUMBING SYSTEMS: Provide for copper pipe 2½" and larger only: Low lead, 150# bronze, threaded connection, union bonnet, solid wedge and rising stem. Nibco T-134 or F-617-0. Gate valves shall be certified and U.L. listed for lead free domestic water use.
- C. BUTTERFLY: 2½" and larger only, 200# full lug ductile iron type body, EPDM stem seals and seat liner, aluminum bronze disc, 416 stainless steel stem, extended neck for insulated lines, notched top plate with handle for throttling. All valves certified suitable for dead end service with no downstream flange. Nibco LD-2000.
- C. BALL VALVE FOR PLUMBING SYSTEMS: Provide for 2" and smaller pipe: Bronze body, threaded connection, full port, Teflon seat, stainless steel trim, extension stem for insulation. Nibco T-585-66-LF-EL.
- D. CHECK: 2" and under, 125# bronze body, bronze swing check with Teflon seat; 2½" and over 125# iron body, flanged, bronze trim. Nibco T-413-Y-LF or W-920-W-LF.
- E. INSULATION PROVISIONS: Valves on insulated lines shall have stems extending through insulation.
- F. INSTALLATION: Ball and butterfly valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve. All valves above a ceiling shall be installed within 24" of the ceiling.
- G. BACKFLOW PREVENTER: Provide Watts Series U-909-SQT preventer at makeup water connection to building chilled and heating water systems. Provide 909AG air gap drain funnel with drain line extension. No other brand or model is acceptable. For sizes 2-1/2" and larger, provide stainless steel body RPZ backflow preventer, Watts model 957 with 957AG air gap drain funnel with drain line extension.
- H. ACCEPTABLE MANUFACTURERS: Hammond, Milwaukee and Nibco

2.12 MISCELLANEOUS PIPING

- A. GENERAL: Provide all required piping not specifically shown on the drawings but necessary for the proper operation of the systems. Piping materials, methods of installation, fittings, valves, etc., shall conform, in general, to that specified for similar piping systems.
- B. TRAP PRIMER PIPING: Use Type K copper. Piping in contact with concrete shall be protected with Benjamin Foster 60-25 mastic, be PVC coated or installed in protective sleeve.
- C. MISCELLANEOUS DRAINS: Provide drain line to floor drain from backflow preventers, relief valves and other plumbing equipment with automatic drains.

2.13 ROUGH-INS AND CONNECTIONS

- A. SPECIAL FIXTURES AND TRIM: Provide rough-ins and connections to cabinet sinks and all trim where shown on the Drawings. Fixtures and trim requiring rough-ins and connections will be furnished loose under the special equipment section of those specifications, installation shall be under this Section. Refer to Architectural Specifications for information on prefab cabinets. Provide stops, risers and P-traps under this Section for prefab cabinets and kitchen equipment provided under the Architectural Specifications.
- B. COORDINATION: The piping and connections for these areas have been indicated approximately. The exact arrangements and locations of various piping and connections shall be determined by shop drawings provided under other sections of these Specifications.

PART 3 - MATERIALS

3.1 EXTERIOR DOMESTIC WATER

- A. GENERAL: This paragraph relates to all water piping below grade, all piping above grade outside of building and piping in contact with concrete.
- B. MATERIALS:
 - 1. PIPING: Type "K" copper rigid water tubing per ASTM B-42 and ASTM B-88, with solder type ASME B 16.18 cast bronze, or ASTM B 16.22 wrought copper alloy fittings, made up with lead-free solder. Solder shall be 95.5% tin, 4% copper, 0.5% silver (lead free, antimony free, zinc-free). Silvabrite 100 by Engelhard Corporation or approved equal. Piping in contact with concrete shall be protected with Benjamin Foster 60-25 mastic or be PVC coated. Victaulic grooved copper piping connection system or equal by Anvil or Grinnell may be used for sizes 3" and larger. Where Victaulic grooved piping is used, Victaulic Style 606/607 couplings shall be used – flaring of rube and fitting ends to IPS dimensions is strictly prohibited and will not be accepted. Viega ProPress copper press joining system/pipe/fittings may be used in lieu of solder or grooved copper systems.
 - 2. MISCELLANEOUS REQUIREMENTS: Connections at water meter shall be as specified by the water district or water department. The 30 feet of piping ahead of the building service shutoff valve shall be Type "K" copper rigid water tubing with sweat fittings and lead-free solder. Install 2" diameter by 6" long capped tee above grade ahead of shutoff valve for electrical grounding use. Install concrete anchors below grade as recommended by the piping manufacturer.

C. COPPER JOINTS:

1. Clean inside and outside of all tubing and fittings.
2. Make up joints with lead-free solder. Solder shall be 95.5% tin, 4% copper, 0.5% silver (lead free, antimony free, zinc-free). Silvabrite 100 by Engelhard Corporation or approved equal. Viega ProPress copper press joining system/pipe/fittings may be used in lieu of solder.

D. TESTING: Test in accordance with recommendations of AWWA.

3.2 INTERIOR DOMESTIC WATER

A. GENERAL: This paragraph relates to all piping inside of building.

B. MATERIALS:

1. All piping shall be hard drawn, copper water tube, Type "L" per ASTM B-88, with solder type ASME B 16.18 cast bronze, or ASTM B 16.22 wrought copper alloy fittings, made up with lead-free solder. Victaulic grooved copper piping connection system or equal by Anvil or Grinnell may be used for sizes 3" and larger. Where Victaulic grooved piping is used, Victaulic Style 606/607 couplings shall be used – flaring of rube and fitting ends to IPS dimensions is strictly prohibited and will not be accepted. Viega ProPress copper press joining system/pipe/fittings may be used in lieu of solder or grooved copper systems.
2. All individual branches serving fixtures, from surface of walls to connections to fixtures or equipment, shall be chrome plated.
3. Solder shall be 95.5% tin, 4% copper, 0.5% silver (lead free, antimony free, zinc-free). Silvabrite 100 by Engelhard Corporation or approved equal. Viega ProPress copper press joining system/pipe/fittings may be used in lieu of solder.

C. AIR CHAMBERS:

1. Install in each water branch, at each fixture and each piece of water supplied equipment.
2. Locate in chases or walls as close to fixture or equipment as possible. Minimum 24" high Type L copper chamber for air, one size larger than branch pipe size.

D. WATER HAMMER ARRESTERS: Provide on both hot and cold water branches in addition to air chambers. Arresters to be Precision Plumbing Products, Inc. or Sioux Chief, size and location to be based on pipe size, fixture unit count and manufacturer's recommendation. Install according to the Plumbing Riser Diagrams. Sizes shown on Riser Diagrams are PDI sizes. Units shall have 3-year warranty.

E. VALVING:

1. Provide valve in branch line to each piece of water consuming equipment or fixture.
2. Generally, stop valves serving fixtures are specified in Plumbing Fixtures Section 22 42 00.
3. Valves not specified under Plumbing Fixtures, but to be located exposed to view, shall be chrome plated.

END OF SECTION

SECTION 22 11 19 – DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Provide all accessories and specialties indicated on the Contract Drawings, as specified, and as required under Section General Plumbing.

PART 2 - MATERIALS AND METHODS

2.1 SPECIALTIES

- A. **HYDRANTS:** See Schedule on Drawings.
- B. **VACUUM BREAKERS:** Provide where required by Plumbing Code or shown on Plans, female inlet and outlet, polished chrome plated vacuum breakers, full size of line.
- C. **WATER HAMMER ARRESTERS:** Provide on both hot and cold water branches in addition to air chambers. Arresters to be Precision Plumbing Products, Inc. or Sioux Chief, size and location to be based on pipe size, fixture unit count and manufacturer's recommendation. Install according to the Plumbing Riser Diagrams. Sizes shown on Riser Diagrams are PDI sizes. Units shall have 3-year warranty.
- D. **VACUUM RELIEF VALVES:**
 - 1. **GENERAL:** Provide on each water heater in cold water inlet connection.
 - 2. **RATING:** AGA certified, 3/4", 21.5 CFM opens at less than 1/2" vacuum, 200 pounds and 250° F.
 - 3. **MODEL:** Watts No. 36A.
 - 4. **ACCEPTABLE MANUFACTURERS:** Cash, McDonnell-Miller and Watts
- E. **HOT WATER CIRCULATING PUMP:**
 - 1. **TYPE:** In-the-line, all bronze or stainless steel construction, designed for domestic water pumping, certified by manufacturer to be suitable for frequent on/off cycling. Manufactured by Grundfos
 - 2. **MOTOR:** Single phase, 120 volt, 1/12 HP with built-in overload protection, non-overloading throughout pumping range.
 - 3. **CAPACITY:** Refer to Plumbing Drawings.

4. ACCEPTABLE MANUFACTURERS: Bell and Gossett PL Series, Grundfos (stainless steel) or Taco cartridge type circulator. Refer to Motors and Starters under Miscellaneous Equipment and Requirements Section.
5. CONTROL: Honeywell L6008C, 40° - 180° range, immersion aquastat. Mount in return line to cycle pump.

END OF SECTION

SECTION 22 13 16 – SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping shown underground shall be buried a minimum of 12 inches to top of pipe. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space.
- B. Piping shall be concealed in wall, chases and above ceilings except in mechanical rooms. All materials shall conform with the City Building Code.
- C. All below grade non-metallic, non-conducting pipe not under building slab shall have a tracer wire installed parallel to pipe. Tracer wire shall be a 14 gage, solid copper wire with PVC jacket with all joints and splices sealed water-tight. Carry end of wire up through slab and terminate in an accessible location. Provide identification label attached to wire.
- D. All piping, fittings and valves shall be manufactured in the United States of America by Tyler or Charlotte Pipe.
- E. Provide pipe markers and valve tags per Section 22 05 53 Identification of Plumbing Piping and Equipment.
- F. After installation and before final inspection, all sanitary piping shall be rodded out to ensure there are no obstructions in the pipe and the systems are free flowing.

PART 2 - METHODS

2.1 EXCAVATION AND BACKFILLING

- A. **GENERAL:** Provide all excavation and backfilling required for the proper installation of all underground piping and other components installed below grade.
- B. **EXCAVATION:** Trench with ladder type trenching machine. Make trenches 12" to 18" wider than outside diameter of pipe. Excavate, backfill and grade trench bottom to required slope. Verify slope with laser level or approved device. Cut out bedding for pipe joints to provide solid bearing surface for entire length of pipe. Backhoe may be used to excavate trench if bottom is properly sloped and compacted to proper grade prior to installation of the piping.
- C. **BACKFILLING:**
 - 1. Backfill for pipe in City Property must comply with City requirements. Also, if Architect's or Structural Engineer's backfill requirements are more stringent, Contractor shall comply with whatever requirements are the most stringent.

2. For drainage lines, provide cement-stabilized sand bed to 6" below bottom of pipe with top surface shaped to accommodate pipe including joints, at the proper flowline. Grading shall be determined by laser level. After installation of the pipe, backfill to 4" above top of pipe with cement stabilized sand. Entire pipe shall be surrounded on all sides by minimum 4" of cement stabilized sand. The remainder of the excavation shall be backfilled with approved backfill material to 95% standard proctor, by hand compaction. Do not place backfill material or second layer of cement stabilized sand until the piping and joints have been inspected and approved.

D. SAFETY SYSTEMS: Refer to Architectural Sections for additional requirements.

2.2 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8". Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion.

B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

<u>Pipe Size</u>	<u>Iron Pipe</u>	<u>Other Pipe</u>
1" & Smaller	6 Feet	4 Feet
1¼" & 1½"	8 Feet	5 Feet
2"	8 Feet	5 Feet
2½" to 4"	8 Feet	6 Feet
6" and Larger	8 Feet	6 Feet

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8". Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. Do not use concrete anchors.

3. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

- a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.
- b. MULTIPLE RUNS: Trapeze hangers.
- c. BEAM CLAMPS: Grinnell Figure 92 for smaller pipe
- d. BEAM CLAMPS: Grinnell Figure 228 (storm or sanitary 8" and larger)

4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.

5. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel. Provide hot dipped copper clad supports for copper piping.

6. PIPE SADDLES: Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16" minimum length. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.
 7. SWAY BRACING: All horizontal piping larger than 4" shall have sway bracing per the manufacturer's recommendations.
- C. PLUMBING CHASE PIPING: Plumbing piping located in chases and at individual fixtures not located at chases shall be rigidly supported and aligned using the Sumner Pipe Support and Alignment System, Hubbard Holdrite System or Unistrut with U-bolts and pipe clips.

2.3 TESTING PIPING SYSTEMS

- A. GENERAL: Test all piping systems to assure that they are absolutely leak free. Test for sanitary piping shall include the first fitting above slab (i.e. transition fitting between underground PVC and cast iron). Pipes that will contain water or sewage shall be leak tested with water. Pipe to be insulated shall be proved leak free before pipe is concealed. Lee Truong & Yu Engineers (LT&Y) to witness and approve all testing. If piping is concealed prior to LT&Y witnessing and approving testing, contractor shall expose entire piping system and re-test piping for LT&Y to witness and approve.
- B. PRESSURE TEST METHOD: For drainage systems, plug outlet and fill piping with water to top of vent. System shall remain plugged and filled with water until after system below grade is backfilled and compacted per specification. Multistory systems shall be tested one floor at a time at ten feet of hydrostatic head with out leaks. Maintain pressure for 8 hours. During this test period, inspect all pipe fittings and accessories in the piping and eliminate all leaks.
- C. UNDERGROUND PIPE TESTING AND INSPECTION
1. Initial open trench underground piping tested to 10-foot head for 8 hours, as always. LT&Y to inspect pipe installation, approve/reject test, approve for backfill.
 2. Pipe to remain full of water through backfill and compaction.
 3. After backfill and compaction, pipes to be topped off for 10-foot head to account for evaporation. New water level to be marked and dated on pipe.
 4. Prior to concrete pour, Architect's CA (already on site for concrete pour) and Contractor to check water levels and Bay to approve/reject test for concrete pour.
 5. After concrete is poured and dry, Architect's CA or LT&Y to check water levels and approve/reject pipe tests accordingly. Test shall not be removed until approval is granted by A/E team.
 6. If water drops or is released prior to A/E review after concrete is placed then an investigation will begin immediately by the sub and GC to locate the problem. If issue is determined to be a leak then it must be located, concrete removed, corrections made, pipe re-tested and water from test left on until after re-compaction and concrete placement.

- D. FINAL TEST: Test underground PVC sanitary drainage piping for physical deformation by passing a mandrel of 95% pipe inside diameter through piping 8" and larger. Just prior to substantial complete, contractor shall smoke test all sanitary and vent piping to confirm that the piping system is complete, access cleanouts are properly installed and all joints are tight. Contractor shall use a commercial smoke generating machine with fan to pressurize the system with smoke. Test shall be witnessed by Owner's Representative and the A/E inspectors. Both Owner and LT&Y must approve smoke testing of sanitary and vent systems before substantial completion can be granted.
- E. UNDERGROUND PIPE CLEANING AND CERTIFICATION: All underground sanitary sewer piping shall be hydro-flushed or rodded all the way to the sanitary manhole that the system is connected to prior to substantial completion. After cleaning, contractor shall provide 3rd-party subcontractor to camera and video tape inside of all underground sanitary sewer piping all the way to the sanitary manhole that the system is connected to, and provide video tape as well as detailed report outlining quality of installation and noting exact areas of poor installation. Contractor shall repair all areas noted as problems and re-camera/video tape those areas to confirm proper installation at no cost to the Owner.

2.4 SLEEVES

Provide sleeves for all piping passing through walls, floors not on grade and roof slabs. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Pipes through grade beams shall be sleeved per structural engineer's drawings. As a minimum pipe shall be wrapped with 1" thick closed cell pipe insulation.

2.5 PLATES

Provide chromium plated wall and ceiling plates for all exposed piping, at point piping passes through walls or ceilings. Plates shall be large enough to completely cover pipe sleeves. On insulated piping, inside diameter of plates shall just exceed outside diameter of pipe covering. Plates may be omitted for pipe sizes larger than 6".

2.6 DIELECTRIC UNIONS

Provide dielectric insulating unions at all connections between dissimilar metals.

2.7 FLASHINGS

- A. Provide flashings for all vent pipes.
- B. Flashings shall be constructed of 4 lbs./s.f. sheet lead, with bases extending not less than 10" on each side of pipe. The vertical portion of flashings shall extend upward entire length of the pipe and be turned down inside of pipe at least 2", unless vent caps are used. Minimum size flashing sheet is 36" x 36". Flashings shall be compatible with the roof system specified by the Architect.

2.8 ROUGH-INS AND CONNECTIONS

- A. SPECIAL FIXTURES AND TRIM: Provide rough-ins and connections to cabinet sinks and all trim where shown on the Drawings. Fixtures and trim requiring rough-ins and connections will be furnished loose under the special equipment section of those specifications, installation shall be under this Section. Refer to Architectural Specifications for information on prefab cabinets. Provide stops, risers and P-traps under this Section for prefab cabinets and kitchen equipment provided under the Architectural Specifications.
- B. COORDINATION: The piping and connections for these areas have been indicated approximately. The exact arrangements and locations of various piping and connections shall be determined by shop drawings provided under other sections of these Specifications.

PART 3 - MATERIALS

3.1 SANITARY SOIL, WASTE AND VENT PIPING

- A. GENERAL: Provide for all fixtures, equipment and floor drains as indicated and as required by Code. Provide appropriate wye fittings and bends. Sanitary crosses and double combination fittings are prohibited. Do NOT install these types fittings. Do not use any fittings prohibited by the codes. All piping shall be manufactured by Charlotte or Tyler Pipe. Do not mix pipe manufacturers on project. All piping shall comply with ASTM D1785/D2665.
- B. MATERIALS:
 - 1. ABOVE SLAB: Standard weight, cast iron, no-hub piping.
 - 2. BELOW SLAB: Schedule 40, DWV PVC. Refer to 2.1 for backfilling requirements.
 - 3. BELOW GRADE, BEYOND FIVE FEET FROM BUILDING: Schedule 40, DWV PVC. Sizes over 6" may be heavy wall SDR-26 PVC sewer pipe meeting ASTM D3034 requirements. Refer to 2.1 for backfilling requirements.
- C. GASKETS: Hub and spigot gaskets shall be Tyler Ty-Seal, positive double seal compression type conforming to ASTM C564. No-hub joints shall be made with gasket and one piece stainless steel, heavy weight, medium duty no-hub clamps. No-hub clamps for pipes 6" and larger shall have 6 bands. Clamps shall be Husky 2000 or equal by Mission.
- D. CLEANOUTS: Install at each change of direction and at locations indicated on drawings. Exact location to be reviewed by Architect prior to setting. Shall be size of the line served, except maximum size of 4". Provide double cleanout for two-way rodding after each pipe exits the building. Wall cleanouts behind access panels shall be within 2" of the panel for ease of use.
- E. DRAINS: Floor drains installed in floors, with waterproofing membranes, to have clamping collars.

- F. GRADING: Continuously grade all drainage piping. Inside building, grade 1/4" per foot for lines 3" and smaller. Grade 1/8" per foot for line 4" and larger. Piping below grade beyond five feet from building shall have maximum continuous slope consistent with site conditions of existing mains to which they will be connected or 1/8" per foot whichever is less (1/4" per foot for lines smaller than 4").
- G. PROVE FREE FLOWING: Hydroflush or rod out all sections of sanitary waste lines prior to substantial completion.

END OF SECTION

SECTION 22 13 19 – SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Provide all fixtures, drains, equipment, accessories and specialties indicated on the Contract Drawings, as specified, and as required under Section General Plumbing.
- B. In addition to the manufacturers listed, equipment of identical design, quality and appearance will be considered when of the following manufacture:

FLOOR DRAINS, CLEANOUTS AND CARRIERS: Josam, Jay R. Smith, Wade or Zurn

PART 2 - MATERIALS AND METHODS

2.1 FLOOR DRAINS

- A. GENERAL: See Plumbing Drawings for model numbers. Some drains for this project are trap primed using Proset Trap Guard – see Plumbing Drawings to determine which drains.
- B. TOILET ROOMS, LOCKER ROOMS, SHOWER AREAS AND SIMILAR LOCATIONS: Cast iron two-piece floor drain with seepage flange, reversible clamping collar, 6" diameter, heavy duty stainless steel strainer, and Proset Trap Guard
- C. EQUIPMENT CONDENSATE DRAINS: Cast iron, medium depth floor drain with flange, clamping device, seepage openings with 12" stainless steel rim, less top grate but with internal ductile iron sediment bucket and Proset Trap Guard – drain designed to not allow installation of grate without installation of sediment bucket.
- D. GRATED EQUIPMENT DRAINS: Cast iron floor drain with flange, seepage openings, 9" heavy duty ductile iron grate with stainless steel veneer, clamping device and Proset Trap Guard.
- E. SANITARY FLOOR SINK: Cast iron floor sink with 8" sump, 12"x12" acid resisting enamel coated interior, heavy duty stainless steel frame and 3/4 tractor grate, ductile iron secondary dome strainer, integral flange with seepage openings for support, clamping device and Proset Trap Guard.

2.2 CLEANOUTS

- A. GENERAL: Install cleanouts at bends, angles, and at ends of all waste and sewer piping and as noted on Drawings. Bring all cleanouts up to grade and make accessible. All cleanouts shall have extra heavy PVC plugs. For cleanouts in unpaved areas, install in 18" x 18" x 6" thick concrete pad. The top of cleanout shall be 2" above grade with the pad sloping to edges at grade level. For cleanouts in paving, sidewalks, etc., install flush with finished surface. Refer to detail on Architectural Drawings. See Plumbing Drawings for model numbers.
- B. MATERIALS:
1. UNFINISHED AREAS AND CHASES: Cast iron caulking ferrule with countersunk head with PVC plug.
 2. FINISHED WALLS: Cast iron caulking ferrule with countersunk slotted head with PVC plug (full size up to 4"). Provide square smooth finish, 8"x8", 16 gauge stainless steel, vandal-proof access cover, flanged frame with anchoring lugs. Also provide flanged frame for pre-finished or CMU walls. Cleanout plug shall be installed within 2" of access panel. Install wall cleanouts at higher level than the flood level rim of surrounding plumbing fixtures.
 3. FINISHED FLOORS: Floor cleanout with adjustable extension housing, cast iron ferrule with PVC plug (full size up to 4"), round scoriated stainless steel, secured, vandal-proof access cover and round frame. Provide top style compatible with floor type. Carpet: - carpet flange (carpet markers will not be acceptable); Terrazzo: - top with terrazzo recess.
 4. OUTSIDE AREAS: Extra heavy duty, vandal-proof ductile iron cover, cast iron ferrule for caulk, PVC plug (full size up to 4") and positioning set screws. In non-surfaced areas these shall be installed in 18" x 18" x 6" thick concrete pad. The top of cleanout shall be 2" above grade with the pad sloping to edges at grade level. Locate as directed by the Architect.

END OF SECTION

SECTION 22 13 23 – SANITARY WASTE INTERCEPTORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Provide all equipment, accessories and specialties indicated on the Contract Drawings, as specified, and as required under Section General Plumbing.

PART 2 - MATERIALS AND METHODS

2.1 SAND/OIL SEPARATORS, GREASE TRAP AND SAMPLE WELLS

- A. Provide as shown on the Drawings, complete with all piping, manhole covers, rims for covers, grates, rim for grates and concrete work.

END OF SECTION

SECTION 22 33 33 – COMMERCIAL ELECTRIC WATER HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Provide all equipment, accessories and specialties indicated on the Contract Drawings, as specified, and as required under Section General Plumbing.
- B. In addition to the manufacturers listed, equipment of identical design, quality and appearance will be considered when of the following manufacture: A. O. Smith, Bradford White, Lochinvar or Rheem/Ruud with three year commercial warranty. Warranty period shall start on the date of the owner's acceptance of the building.
- C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1

PART 2 - MATERIALS AND METHODS

2.1 ELECTRIC WATER HEATER

- A. DESCRIPTION: Glass lined tank, 2" fiberglass tank insulation with enameled steel jacket, three year commercial warranty (tank and parts), magnesium anode rods, ASME labeled T & P relief valve pipe to drain, vacuum breaker on inlet, adjustable controller and high limit safeties. Warranty period shall start on the date of the owner's acceptance of the building.
- B. ELECTRICAL ELEMENTS: Shall have two non-simultaneous elements, built-in fusing and disconnecting means, U. L. listed. Provide proper voltage and rating as scheduled on the Drawings.
- C. ACCEPTABLE MANUFACTURER: A. O. Smith, Bradford White, Lochinvar or Rheem/Ruud.

END OF SECTION

SECTION 22 42 00 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Provide all fixtures, drains, equipment, accessories and specialties indicated on the Contract Drawings, as specified, and as required under Section General Plumbing.
- B. All fixtures and equipment shall be constructed of materials that are non-hazardous to the user. No lead or lead solder may be used where in contact with potable water, or asbestos for any purpose.
- C. Faucets, shower heads, shower valves and similar items shall have chrome plated brass handles, spouts, plates and trim.
- D. Include all necessary accessories and trim pieces such as escutcheons, traps, supply tubing, stop and basin cocks, etc. All brass piping shall be seamless brass tubing. Fittings shall be heavy cast brass. Nipples shall be extra heavy. All exposed pipe shall be chrome plated.
- E. All flush valves shall have screwdriver angle stops with cap covers, vacuum breakers and be chrome plated. P-traps shall be cast brass body, adjustable type with bottom cleanout plug and 17 gauge tubing outlet with wall flange, chrome plated where exposed to view. Provide Marvel mechanical coupling for connection to copper piping. Provide 1/2" x 3/8" angle valve, loose key, supply stops with flexible supply risers for fixtures, chrome plated when exposed to view. Provide four stop keys.
- F. Handicap fixtures shall have handicap compatible trim including stops and supplies, drains and valves. Provide Truebro Handi Lav-Guard vandal proof insulation kit over p-trap supplies and all sharp edges. Prowrap by McGuire or Trap Wrap by Brocar Products, Inc., will also be acceptable. Controls for flush valves shall be mounted on the wide side of toilet areas as required by the handicap codes.
- G. All flush valves and self-closing faucets shall be adjusted for proper operation. Faucets shall have an "on" time of 4 to 5 seconds.
- H. Hot water shall be piped to left hand side of plumbing fixture as user faces fixture.
- I. Fixtures and equipment shall be delivered to the building properly crated and in perfect condition.
- J. Install Bradley ASSE 1070 certified point of use mixing valve on HW supply side of all lavatories and sinks where fixture not already protected by a ASSE 1070 certified mixing valve, including fixtures not provided by Plumbing Contractor (i.e. lab sinks, kitchen faucets, etc.). Refer to Plumbing Drawings. Mixing valve by Symmons, Leonard and Powers also acceptable.

1.3 ACCEPTABLE MANUFACTURERS

- A. WATER CLOSETS, LAVATORIES AND URINALS: American Standard or Toto (no mixing of manufacturers – all vitreous china fixtures shall be from same manufacturer).
- B. SINKS AND SERVICE SINKS: Elkay or Just
- C. MOP BASINS: Stern Williams or Fiat
- D. DRINKING FOUNTAINS: Elkay or Halsey-Taylor (NO ELECTRONIC SOLENOID VALVE)
- E. TOILET SEATS: Bemis 1655-C/SS with stainless steel, self-sustaining check hinge or equal by Church
- F. FAUCETS: Chicago or Zurn.
- G. METERING FAUCETS: Chicago only.
- H. FLUSH VALVES: Sloan Royal or Toto. Electronic flush valves to have a true mechanical override.
- I. FIXTURE STOPS, P-TRAPS AND RISERS: McGuire or Zurn.
- J. CARRIERS: J.R. Smith, Wade or Zurn (same manufacturer as drains and cleanouts).
- K. INDIVIDUAL SHOWER VALVES: Symmons Safetymix, Bradley HD, Leonard PAM II or equal by Powers.

PART 2 - MATERIALS AND METHODS

2.1 FIXTURE SUPPORTS

- A. GENERAL:
 - 1. Provide fixture supports for all water closets, lavatories, urinals, drinking fountains and other wall hung fixtures.
 - 2. All foot supports on all types of fixture supports shall be the type that does not extend out from under the wall on which the fixture is mounted.
 - 3. Construction and installation of the supports shall be as required to suit the job conditions, the space available, and the riser diagrams and details on the Drawings.
- B. CARRIERS:
 - 1. WATER CLOSET CARRIER: Adjustable, horizontal or vertical closet carrier as required by waste piping. Provide hanger-rod support feet for carriers that span wide chases. Provide flush valve supply support with all water closet carriers. Carriers shall be designed for 500-pound load, minimum.
 - 2. LAVATORY CARRIER: Floor mounted steel uprights with concealed arms.
 - 3. URINAL CARRIER: Floor mounted steel uprights with hanger and bearing plate. Provide flush valve supply support with all urinal carriers.

4. ELECTRIC DRINKING FOUNTAIN AND BUBBLER CARRIERS: Floor mounted steel uprights with hanger and bearing plate.
5. SERVICE SINK: Floor mounted steel uprights with hanger and bearing plate.
6. SCULLERY SINKS: Floor mounted steel uprights with hanger and bearing plate. Provide at each end of fixture where sink width requires it.
7. WASH FOUNTAINS: Floor mounted steel uprights with hanger and bearing plate. Provide at each end of fixture where sink width requires it.

2.2 FIXTURES

See Drawings.

END OF SECTION

SECTION 23 00 00 - GENERAL HVAC

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. Drawings and Specifications are intended to be complimentary. Any work exhibited in either of them whether in the other or not, is to be executed according to true intent and meaning thereof, the same as if set forth in all. Should any work required by the drawings and specifications be in violation of any Federal, State, County or City laws, ordinance or regulation, those laws and regulations shall prevail, and shall be complied with by the Contractor as a part of this work with no extra compensation.
- B. The drawings are schematic in nature, but show the various components of the system approximately to scale and indicate how they are to be integrated with other parts of the building. Determine exact locations by close coordination with the Owner's Representative, job measurements, determining the requirements of other trades and reviewing all contract documents. The Drawings indicated general routing of the various parts of the systems, but do not indicated all fittings, offsets and runouts which are required. The Contract includes these items as required to fit the system into spaces allotted for them.
- C. Equipment that is scheduled is the basis of the design, and have been coordinated for space, installation and electrical requirements. Space, installation and electrical requirements for other equipment and models from acceptable manufacturers have not been verified or coordinated. Contractor shall verify these requirements prior to using other equipment in his bid and include any additional costs for installation of the equipment. This includes general construction and MEP costs.

1.3 PERMITS AND FEES

The contractor shall obtain and pay for all permits and licenses, file all notices, pay all legal fees and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work specified or shown on the drawings. This applies to Federal, State and Local Codes and Requirements. Approval to the various insuring and inspection authorities shall also be obtained. Refer to Architectural sections for additional information.

1.4 GUARANTEE

All materials, apparatus and equipment furnished and installed under this Section of these Specifications shall be new and free from any defects when accepted by the Owner and shall be guaranteed in writing for a period of one year from the date of acceptance by the Owner unless noted to have extended warranties.

1.5 COOPERATION

The Contractor shall cooperate with other trades on the job and make installations in the proper sequence during the construction of the buildings, and he shall notify the Architect well in advance of construction of all interference of his work with that of other trades and of building construction. This notification shall not relieve the contractor of his responsibilities.

1.6 VISITING THE SITE

The Contractor shall be familiar with the Drawings and Specifications and shall have examined the premises and understand the conditions under which he will be obligated to operate in performing the contract. No allowance shall be made consequently for any error through negligence in this regard.

1.7 WORKMANSHIP

All work shall be performed in a neat workmanlike manner and in the best practice of the trade. Only workmen skilled in the trades shall be employed to perform the work included in these specifications.

1.8 MATERIALS

- A. Materials, when not otherwise definitely specified, shall conform to applicable National Specifications and Standards. All materials shall be certified to not contain any asbestos or other material banned by the Environmental Protection Agency. Lead shall not be used in any material, pipe or solder in contact with the domestic water system.
- B. The names of manufacturers and model numbers have been used in the Contract Documents to establish type of equipment and standard of quality. Where only one name is mentioned for a particular item of material, then that manufacturer is the only one acceptable. Where several names are mentioned, any one of those listed may be furnished provided submittal contains sufficient information to show complete compliance with contract Documents. No attempt has been made to determine if each manufacturer listed will produce material that will comply with all requirements of this project or will fit the allotted space; if they do, then it will be acceptable.
- C. Requests for substitution during the bidding period, in accordance with the requirements of the Special Conditions, must be accompanied by a complete product submittal with all features, accessories and capacities noted. Large equipment must include a 1/4" scale drawing showing how the equipment and required access space are compatible with the available space. Acceptance for bidding does not waive the post bidding requirement for formal submittal and approval.

1.9 REMOVAL OF RUBBISH AND CLEAN-UP

Keep area of operations free from accumulation of waste material or rubbish at all times. At the completion of the work, remove all rubbish, tools, scaffolding and surplus materials from the area of operations. The exposed parts of the Mechanical installation which are to be painted shall be thoroughly cleaned of cement, plaster, grease, oil spots and other materials in preparation for painting. All piping shall be cleaned of cement, plaster and other construction debris prior to being concealed above accessible ceilings or being insulated. Clean exposed piping prior to final inspection. All construction areas shall be left "broom" clean on a daily basis. Prior to final acceptance, vacuum clean all mechanical rooms including equipment. Building shall be kept

broom clean prior to starting any mechanical equipment to minimize dust in the system.

1.10 OPERATION TESTS AND ADJUSTMENTS

After completion of the work and before final acceptance thereof, the Contractor shall notify the Architect when he is ready for the balancing of air and hydronic systems which will be performed by a professional test and balance firm selected by the Owner as described in Section 23 05 93.

1.11 LUBRICATION

After the installation is completed, lubricate all moving parts of all equipment furnished under this Division of the Specifications requiring same. Leave with the Owner a brief but complete set of lubrication instructions, showing the recommended frequency of lubrication and the type of lubricant recommended for each piece of equipment.

1.12 NOISE AND VIBRATIONS

The Contractor shall guarantee that the entire system and its component items of equipment, as installed by him, shall operate without objectionable vibration or noises, as determined by the Architect. If, in the opinion of the Architect, objectionable vibration or transmission thereof to the building occurs, the Contractor shall execute such remedial measures as are necessary to eliminate such unsatisfactory operating conditions and the material and labor thereby required shall be performed at the Contractor's expense.

1.13 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. ELECTRICAL: Power wiring is specified in the Electrical Section. Interlock and control wiring (any voltage) is specified under this Section. Controllers and starters, unless part of a motor control center, are specified under this Section.
- B. PAINTING OF EQUIPMENT, PIPING AND ACCESSORIES: Painting Section. However, all items furnished under this Section shall be kept clean and free from corrosion.
- C. OPENINGS: Various Sections. However, the locations of all inserts and openings shall be determined under this Section and coordinated with other Sections in ample time to avoid cutting new construction.
- D. CUTTING, PATCHING AND FURRING: Various Sections. However, the locations of all inserts and openings shall be determined and coordinated with other sections.
- E. EQUIPMENT AND PIPING SUPPORTS: Refer to structural drawings, details and notes for specific support and pipe hanging requirements. Specific loading and attachment methods shall be followed to assure that individual structural members are not overloaded.
- F. COMMISSIONING: A separate Commissioning Agent is a part of this project. Contractor shall work with the Commissioning Agent to ensure that he is available to view the various tests and construction milestones.

1.14 GENERAL EQUIPMENT REQUIREMENTS

Manufacturer's printed directions shall be followed for preparing, assembling, installing, erecting and cleaning manufactured materials or equipment, unless otherwise directed.

1.15 SHOP DRAWINGS

- A. Submit seven complete sets of shop drawings checked and certified by the contractor as being checked, and lists of materials furnished under this Division. Shop drawings shall be approved before installation of the material under consideration.
- B. Shop Drawings shall consist of published ratings of capacity data, detailed construction drawings, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings and other pertinent data. Where the literature is submitted covering a group or series of similar items, the item under consideration shall be clearly indicated. Shop drawing shall list VOC of materials. Materials with VOC levels higher than LEED and code requirements will be rejected. Contractor shall provide complete scaled drawings of all systems including piping layouts, equipment locations and connections, and coordination with plumbing and electrical conduit and fixtures to ensure no conflicts exist. The front sheet of each copy of the submittal shall have the following typed information:
 - 1. Job name and location.
 - 2. General Contractor's name, address, Project Manager's name and telephone number.
 - 3. Submitting Sub-contractor's name, address, Project Manager's name and telephone number.
 - 4. Suppliers company name, address, salesman's name and telephone number.
 - 5. Signature of an officer or attorney-in-fact of the Sub-contractor with date and title and a statement that the submittal materials and equipment complies with the Contract Documents.

Any submittal without all of the above information will be rejected without review.

- C. Equipment that has regional representation shall only be supplied by the regional representative that serves the area where the project is located. The regional representative's name and signature shall be included with the shop drawing.
- D. Shop Drawings are required for but are not limited to the following items:

VRV Units/Systems	Fans	DX-split system
Ductwork	Insulation	Air Devices
Fire Dampers	Piping Materials	Pipe Markers
- E. Approval of these submittals shall not be construed as releasing the contractor from compliance with the contract Documents. They are a means of coordinating the work and aiding in the proper selection and installation of equipment. Do not release items such as fire dampers and starters until associated equipment or ductwork drawings are approved. All materials and equipment shall be subject to final acceptance by the Engineer at the completion of construction and adjustments of the system.

- F. If a submittal is returned to the Contractor marked "Rejected" or "Revise and Resubmit", only one (1) additional submittal will be permitted without the Contractor incurring charges for the additional re-submittals. LEE TRUONG & YU ENGINEERS (LTY) shall be reimbursed by the Contractor for any expense in connection with any necessary submission in addition to the two (2) submissions allowed. Contractor will be billed by LTY at a rate of \$125/hr for these occurrences.

1.16 PROTECTION OF EQUIPMENT

- A. Do not deliver equipment to jobsite until progress of construction has reached the stage where equipment is actually needed, or until building is closed in enough to protect equipment from the weather. Equipment allowed to stand in weather will be rejected, and Contractor is obligated to furnish new equipment at no cost to Owner.
- B. Adequately protect equipment (including all Owner-furnished items) from damage after delivery to job. Cover with heavy cloth as required to protect from damage.
- C. Equipment which has been damaged by construction activities will be rejected. Contractor shall furnish new equipment at no cost to Owner.

1.17 CUTTING AND PATCHING

Coordinate the work with other trades to arrange for all holes, chases, and other spaces necessary for the installation of all components of the mechanical systems. Inform the other trades in ample time for these to be provided. Failure to comply with this requirement may necessitate cutting and patching work. If such work becomes necessary, it will be done under this Section of the specifications, and shall conform to all applicable requirements of other Sections of the Specifications.

1.18 STRUCTURAL STEEL

All structural steel used for the purpose of fabricating pipe supports, pipe guides, pipe anchors, equipment supports, and framing for large ducts and plenums, shall conform to ASTM Designation A-36. All steel used for these purposes shall be new, clean, straight and galvanized.

1.19 SPARE PARTS LISTS, OPERATING INSTRUCTIONS

At completion of job, furnish three copies of spare parts lists and operating instructions for all equipment furnished under this Division. These lists and instructions shall be published by the manufacturer of the equipment and shall be in good condition. Bind in 3-ring binder with project name.

1.20 TOOLS AND SPARE PARTS

Upon completion of the installation, deliver to the Owner all tools and spare parts that are furnished by the Equipment Manufacturer for use with the equipment furnished under this Contract.

1.21 REFRIGERANT AND OIL

Furnish and install full refrigerant and oil charge in the air conditioning refrigeration systems and maintain it for full term of the guarantee.

1.22 RECORD DRAWINGS

Obtain a set of project drawings and keep these at jobsite during construction. During the course of construction, mark on these prints any changes which are made, noting particularly locations for those items which will need to be located for servicing. At completion of job, mark each sheet "Record Drawings", date and deliver to Architect.

1.23 OWNER'S INSTRUCTIONS

- A. Provide the following periods of instruction to the Owner's designated personnel upon completion of the system's installation:

HVAC System - 8 Hours
Temperature Controls Systems - 8 Hours

- B. Operation and maintenance manuals (including start-up reports) shall be provided prior to training/demonstration.

1.24 ALTERNATES

Determine the scope of each specified alternate proposal by carefully reading all Divisions of the Documents. The Bid Form contains information explaining the extent of the construction to be performed under a specific alternate. Alternate proposals, which are not predominantly mechanical in scope, are described in other Divisions of these Documents. Pay particular note to re-roofing items that may necessitate adjustments to existing piping.

1.25 MECHANICAL INSPECTIONS

- A. Contractor shall formally request inspections from LTY to review any and all MEP installations. Inspections shall include but not be limited to: pipe tests, underground installations prior to backfill, rough-in installations, wall cover inspections, above ceiling inspections, final inspection.

- B. Information required from Contractor on each and every request for inspection is as follows:

1. Specific type of test (i.e. hydrostatic test, head pressure test, medium pressure duct test, etc.).
2. Exact location of test (i.e. area of building with wing or room numbers).
3. Description of test (i.e. partial inspection, walls only, chase walls, wall cover, ceiling cover, etc.)
4. Exact time test started (required test time per Project Manual will need to have elapsed prior to LTY inspection). Estimated time test will start will not be acceptable.
5. Pressure reading on gauge at time of request for all pipe tests (provide picture of gauge with request).

6. Verification from General Contractor with name of person that verified, that specific test has been verified by the Contractor and all sub-contractors to meet all requirements of the Specifications and Codes (prior to inspection request).
- C. Contractor shall provide a MINIMUM of 48-hour notice prior to requested inspection time, no exceptions.
- D. INSPECTION REPORTS: After each inspection, LTY will generate an inspection report and distribute promptly. The Contractor will then be given 7 working days from date of report to address all deficiencies listed on the report. The GENERAL CONTRACTOR shall verify that all items on each inspection report have been addressed by their subcontractors in this time period. Once verified the GENERAL CONTRACTOR shall sign-off on each deficiency listed on the report and return the signed-off copy of the inspection report to LTY via e-mail. After the signed-off report is returned to LTY, the GENERAL CONTRACTOR shall request a re-inspection by LTY to close the report. If after 7 working days no re-inspection is requested by the GENERAL CONTRACTOR to close a report, LTY reserves the right to re-inspect whenever our schedule allows, with these re-inspections still being subject to Paragraph E below.
- E. TEST REJECTIONS AND RE-INSPECTIONS: If a test is rejected or a re-inspection of an issued LTY Inspection Report is found to NOT be completely addressed, only ONE (1) additional inspection will be permitted without the Contractor incurring charges for each additional inspection required. LTY shall be reimbursed \$500 by the GENERAL CONTRACTOR for expenses in connection with EACH inspection in addition to the two (2) inspections allowed.

1.26 TESTING

All testing shall be witnessed by the Owner's Representative and the Commissioning Agent's Representative. Notify/coordinate with these personnel for all testing scheduled.

END OF SECTION

SECTION 23 05 48 – VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Provide the miscellaneous HVAC and Plumbing Equipment materials and services as shown on the Drawings and specified herein.

PART 2 - MATERIALS

2.1 VIBRATION ISOLATION

- A. **GENERAL:** All vibration isolation devices shall be designed and furnished by a single manufacturer, or supplier, who will be responsible for adequate coordination of all phases of this work. Submittal data shall show type, size and deflection of each isolator proposed.
- B. **CORROSION PROTECTION:**
 - 1. All vibration isolators shall be designed or treated for resistance to corrosion.
 - 2. Steel components shall be PVC coated, or phosphated and painted with industrial grade enamel. All nuts, bolts and washers shall be zinc electroplated. Structural steel bases shall be thoroughly cleaned of welding slag and primed with zinc chromate or metal etching primer. A finish coat of industrial enamel shall be applied over the primer.
- C. **SELECTION:** Spring deflections listed are static deflection and are minimum requirements. Isolation efficiencies listed are minimum requirement. The springs shall be capable of 30% over-travel before becoming solid (minimum 1/2" clearance at final inspection). All isolators supporting a given piece of equipment shall be selected for approximately equal deflection.
- D. **FIRST TWO PIPE HANGERS FROM EACH PIECE OF EQUIPMENT ISOLATED ON SPRINGS:** Provide a spring hanger consisting of a rectangular steel box, coil spring, spring cups, neoprene impregnated fabric washer and steel washer. The hanger box shall be capable of supporting a load of 200% of rated load without noticeable deformation or failure. Static deflection shall be equal to isolation units supporting equipment to which piping is connected.
- E. **FIRST TWO PIPE HANGERS FROM EACH PIECE OF EQUIPMENT ON ISOLATORS OTHER THAN SPRINGS:** Provide an elastomeric hanger, consisting of a rectangular steel box and an elastomeric isolation element, which shall be of Neoprene or high quality synthetic rubber with anti-ozone additive. The elements shall be designed for approximately 1/4" deflection and loaded so that deflection does not exceed 15% of the free height of the element. The design shall be such as to prevent metal-to-metal contact between the hanger rod and the steel box.
- F. **AIR HANDLING UNITS:** Units are internally isolated from the factory.

1. GENERAL: Provide an aluminum housed, adjustable, spring mounting having telescoping top and bottom sections separated by resilient inserts of neoprene or other suitable material to limit horizontal motion. The inserts shall be permanently lubricated to minimize vertical friction. Steel or cast iron housings may be used if they are cadmium plated or hot-dip galvanized after fabrication. A neoprene pad having a minimum thickness of 1/4" shall be bonded to the base plate. Amber Booth XLS, Style A.
2. FLOOR MOUNTED AT GRADE LEVEL:
 - a. 5 HP OR LESS: 1" deflection, 90% efficiency.
 - b. 7½ HP THRU 20 HP: 1½" deflection, 90% efficiency.
3. FLOOR MOUNTED ABOVE GRADE:
 - a. 5 HP OR LESS: 1½" deflection, 95% efficiency.
 - b. 7½ HP THRU 30 HP: 2" deflection, 95% efficiency.
4. STRUCTURE SUPPORTED UNITS: Spring hanger, same as pipe hanger.
 - a. 5 HP OR LESS: 1½" deflection, 95% efficiency.
 - b. 7½ HP THRU 20 HP: 2" deflection, 95% efficiency.
- G. PUMPS: Mount pumps on CPF inertia base consisting of steel pouring frame with reinforcing bars welded in place and inboard isolator attachments with Amber/Booth Type RSW-1 spring isolators, 1" deflection.
- H. FLEXIBLE HOSE: Flexible connections at pumps shall be stainless steel flexible hose with flanges and stainless steel wire braid. Amber Booth Type SS-FP.
- I. FLEXIBLE COUPLINGS: Condenser water connections at fiberglass cooling tower shall be Resistoflex Style R6905, molded TFE Teflon expansion joint with limit stops
- J. AIR COMPRESSOR: Mount air compressor on a pad type mounting consisting of two layers of 3/8" ribbed neoprene bonded to galvanized steel separator plate with free hole drilled through all. Provide top bearing plate with hole to spread point loads. Size pads for approximately 40 PSI load.
- K. CHILLERS: See Chiller Specification
- L. FANS:
 1. GENERAL: This Section refers to in-line fans and other structure hung fans including CVT (VAV) BOXES.
 2. FANS LARGER THAN .5 HORSEPOWER: Provide a spring hanger consisting of a rectangular steel box, coil spring, spring cups, neoprene impregnated fabric washer and steel washer. The hanger box shall be capable of supporting a load of 200% of rated load without noticeable deformation or failure. Size for 1½" deflection, 95% efficiency.
 3. SMALL HORSEPOWER, STRUCTURE MOUNTED FANS INCLUDING CVT BOXES: Provide an elastomeric hanger, consisting of a rectangular steel box and an elastomeric isolation element, which shall be of Neoprene or high quality synthetic rubber with anti-ozon additive. The elements shall be designed for approximately 1/4" deflection and loaded so that deflection does not exceed 15% of the free height of the element. The design shall be such as to prevent metal-to-metal contact between the hanger rod and the steel box.

- M. ACCEPTABLE MANUFACTURERS: Amber/Booth, Kinetics, Mason, Vibra-Sonics, Vibration Eliminator and Southeastern Hose.

PART 3 - EXECUTION

- 3.1 Installation shall comply with manufacturer's requirements and installation details on the Drawings.

END OF SECTION

SECTION 23 05 53 – IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 - MATERIALS AND METHODS

2.1 EQUIPMENT MARKING

- A. **GENERAL:** Each piece of mechanical equipment shall be suitably marked with the name as listed on the plans. Name shall be prominently displayed so it may be easily located and read after equipment installation. Pumps may be marked on adjacent piping.
- B. The following equipment shall be marked with decal or stencil painted, 2" high letters:
 - 1. CU's
- C. The following equipment shall be marked with decal or stencil painted, 1" high letters:
 - 1. Fans
 - 2. FCU's
 - 3. CCU's
- D. Install factory made arrow marker on piping in Mechanical Rooms.

2.2 PIPE MARKING

- A. Identify all system piping. Use EMED Co. Kwik-Koil Pipe Markers of appropriate legend and background color, complete with direction arrow. Select appropriate size for O.D. of piping including insulation. Markers or arrows not wrapping the full circumference of the pipe shall be tie wrapped in place, otherwise taped at each end.
- B. Apply markers as follows:
 - 1. At input and output of each piece of equipment inside building.
 - 2. At every point a pipe enters or exits a wall or floor.
 - 3. At intervals not exceeding 20 feet.
- C. These markers shall conform to OSHA and ANSI A 13.1 Codes. Arrow markers must have same ANSI background colors as their companion pipe markers and wrap completely around pipe with 3" overlap.
- D. Pipe markers and arrow markers shall be provided as follows:
 - 1. Refrigerant Suction
 - 2. Refrigerant Liquid
 - 3. Condensate Drain Line

END OF SECTION

SECTION 23 05 93 – HVAC TESTING AND BALANCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Do all work required for preparation for HVAC Systems Testing and Balancing to be accomplished by others.
- B. The Testing, Adjusting and Balancing will be contracted and paid for directly by the Owner and will be coordinated with all requirements of Division 23.
- C. The general contractor and appropriate sub-contractors shall turn over the completed job to the TAB contractor before testing begins. The general contractor shall ensure the system is fully operational, has been cleaned and new airfilters installed in all air-handling units prior to requesting the TAB contractor to perform his work.
- D. It shall be the responsibility of the general contractor and appropriate Sub-contractors to cooperate with the Owner's TAB contractor in furnishing personnel during the tab to make such adjustments and corrections specified by the Tab, including but not limited to sheave changes.
- E. Provide all instruments and equipment required to accomplish necessary testing and adjusting, and as required by the Architect to verify performance. All instruments shall be in accurate calibration, and shall be calibrated in ranges that will be expected.
- F. The general contractor to furnish two sets of reproducible test and balance reports and shop drawings.

1.3 DESIGN CONDITIONS

The air conditioning systems have been designed and the equipment selected to perform as follows:

Summer Conditions

Indoor Temperatures	74° F DB	55% RH
Outdoor Temperatures	97° F DB	77° F WB

Winter Conditions

Indoor Temperatures	70° F DB
Outdoor Temperatures	27° F DB

PART 2 - METHODS

2.1 GENERAL

- A. The HVAC contractor shall clean and adjust all systems as described in paragraph 2.2.
- B. The testing, adjusting and balancing (TAB) of the air conditioning systems and related ancillary equipment for the Owner will be performed by an impartial, technical TAB firm selected and employed by the Owner as described in paragraph 2.4.

2.2 HVAC

A. HVAC CONTRACTOR'S SCOPE OF WORK

1. As a part of this contract, the HVAC Contractor shall make any changes in the sheaves, belts, dampers, valves, pump impellers, etc. required for correct balance as required by the TAB firm, at no additional cost to the Owner.
2. The HVAC Contractor shall provide and coordinate services of qualified, responsible subcontractors, suppliers and personnel as required to correct, repair or replace any and all deficient items or conditions found during the testing, adjusting and balancing period.
3. In order that all systems may be properly tested, balanced and adjusted as required by these Specifications, the contractor shall operate the systems at his expense for the length of time necessary to properly verify their completion including final adjustments, balancing and readiness for Owner's TAB firm. This length of time shall be acceptable to the Inspector. Contractor shall provide all devices to verify correctness of operation.
4. Contract completion schedules shall provide sufficient time to permit the completion of TAB firm's services prior to Owner occupancy.
5. The Drawings and Specifications have indicated valves, dampers and miscellaneous adjusting devices for the purpose of adjustment to obtain optimum operating conditions, and it shall be the responsibility of the contractor to install these devices in a manner that will leave them adjusted, accessible and readily adjustable. Should any such device not be readily accessible, the contractor shall provide access as requested by the TAB firm. Any malfunction encountered by TAB personnel and reported to the contractor or to the inspector shall be corrected by the contractor immediately so the balancing work can proceed.
6. The scope of the TAB work as defined herein is indicated in order that the contractor will be appraised of the coordination, adjustment and system modification which will be required under the project work in order to complete the Owner's requirements for final TAB. The TAB firm will not have a contractual relationship with this contractor but will be responsible to the Inspector and Owner for the satisfactory execution of the TAB work. The contractor shall allow sufficient funds in the project cost estimate and bid proposal to provide all work which may be required in the TAB phases as defined herein and as may be necessary for the completion of the TAB work as defined by the TAB firm.

B. RELATED WORK

1. The contractor shall have the building and air conditioning systems in complete operational readiness and shall perform all other items as described herein to assist the TAB company in performing the balancing, testing and adjusting of the HVAC systems.
2. For the air distribution systems the contractor shall complete and verify the following:
 - a. Verify installation for conformity to design. All supply, return and exhaust ducts terminated.
 - b. All volume, splitter, extractor and fire dampers properly located and functional. Dampers shall provide tight closure and full opening, smooth and free operation.
 - c. All supply, return, exhaust, transfer grilles, registers, diffusers and terminal units installed, leak tested and operational.
 - d. Air handling systems, units and associated apparatus, such as heating and cooling coils, filter sections, access doors, etc., shall be blanked and/or sealed to eliminate excessive by-pass or leakage of air.
 - e. All fans (supply, return, relief and exhaust) operating and verified for freedom from vibration, proper fan rotation and belt tension; overload heater elements to be of proper size and rating; and clean filters installed.
3. For the automatic controls system the contractor shall complete the following:
 - a. Verify that all control components are installed in accordance with project requirements, a point-to-point check of all DDC and computer controls has been completed and that all controls are functional, including all electrical interlocks, damper sequence, air and water resets, fire and freezestats.
 - b. All controlling instruments calibrated and set for design conditions.
4. The contractor and the suppliers of the equipment installed shall all cooperate with the TAB firm to provide all necessary data on the design and proper application of the system components and shall furnish all labor and material required to eliminate any deficiencies or mal-performance. Furnish a list of all motors with nameplate data and size of overload heater installed with motor amperage during operation.
5. During the balancing the temperature regulation shall be adjusted for proper relationship between controlling instruments and calibrated by the Control Manufacturer using data submitted by the TAB firm. The correctness of the final setting shall be proved by taking hourly readings for a period of three successive eight hour days, in a typical room on each separately controlled zone. The total variation shall not exceed 2° F from the preset medium temperature during the entire temperature survey period.
6. In all fan systems, the air quantities shown on the plans may be varied as required to secure a maximum temperature variation of 2° F within each separately controlled space, but the total air quantity indicated for each zone must be obtained. It shall be the obligation of the contractor to furnish or revise fan drives and/or motors if necessary, without additional cost to the Owner, to attain the specified air volumes.
7. The contractor shall assist the TAB firm in performing three inspections approximately 30 days apart within 90 days after occupancy of the building to insure that satisfactory conditions are being maintained throughout and to correct any unusual condition.

8. The contractor shall assist the TAB firm in performing inspections in the building during the opposite season from that in which the initial adjustments required to produce optimum operation of the system components, to produce the proper conditions in each conditioned space.

C. STORAGE

The contractor shall provide the TAB firm a secure area of ample size, conveniently located for storage of tools, equipment and other items as required.

D. NOTIFICATION

1. Systems shall be complete and in operational readiness prior to notifying the Owner that the project is ready for the services of the TAB firm and the contractor shall so certify in writing to the Owner that such a condition exists.
2. Should the Owner be so notified and the TAB work commence and the systems are found to not be in readiness or a dispute occurs as to the readiness of the systems, the contractor shall request an inspection be made by the Owner. This inspection shall establish to the satisfaction of the represented parties whether or not the systems meet the basic requirements for TAB services. Should the inspection reveal the notification to have been premature, all costs of the inspection and work previously accomplished by the TAB firm shall be paid for by the contractor. Furthermore, such items as are not ready for TAB services shall again be re-tested. Complete, operational readiness, prior to commencement of TAB services, shall include the work described in RELATED WORK above.

2.3 HVAC TESTING, ADJUSTING AND BALANCING

- A. The testing, adjusting and balancing of the air conditioning systems will be performed by an impartial technical firm whose operations are limited only to the field of professional TAB. The TAB work shall be done under the direct supervision of a qualified engineer employed by the TAB company. Work shall be in accordance with procedures and techniques as outlined in the ASHRAE Systems Handbook on TAB and procedural standards for TAB, National Environmental Balancing Bureau.
- B. The TAB firm shall be responsible for inspecting, adjusting, balancing and tabulating the data on the performance of fans, all dampers in the duct systems, all air distribution devices and the flow of water through all coils. The Mechanical Subcontractor, the various subcontractors involved and the suppliers of the equipment installed shall all cooperate with the TAB firm to provide all necessary data on the design and proper application of the system components and shall furnish all labor and material required to eliminate any deficiencies or mal-performance.
- C. Professional firms desiring to submit proposals for the performance of professional services for testing and balancing of HVAC systems for projects shall submit the necessary brochures, history of the firm, qualifications of personnel and other pertinent information to Fort Bend ISD.
- D. Professional firms submitting such information on its qualifications and personnel shall keep the information current by submittal of supplemental data a minimum of once every six months or when professional or technical personnel who shall perform the work may change. The Owner shall review the qualified professional firms, with current qualifications submitted, which may be available to perform this work and request proposals, from time to time, for new projects.

E. Each professional firm warrants by the submittal of its personnel qualifications, that such personnel shall be used in the performance of the work. In the event of personnel change, the professional firm submitting a proposal shall submit the complete qualifications and experience record of new personnel. The Owner, upon acceptance of the proposal, expects the work to be performed by the personnel whose experience is so described.

F. QUALIFICATIONS OF THE FIRM

1. The firm shall be one which is licensed to do professional services of this specified type in the State of Texas and as a minimum, have one professional engineer licensed in the State of Texas, with current registration, to perform such professional services.
2. The firm shall have a minimum of one year operation under its current firm name.
3. The firm shall be capable of performing the services specified at the location of the facility described within the time specified, preparing and submitting the detailed report of the actual field work performed and following up the basic work as may be required.

G. DOCUMENTS

1. The Owner will provide plans, specifications and change orders to the TAB firm.
2. The Owner will provide approved submittal data on equipment installed.
3. The Owner will transmit one copy of the following "Records for Owner" to the TAB firm for review and comment:
 - a. "As-Installed" Drawings
 - b. Approved Fixture Brochures, Wiring Diagrams and Control Diagrams
 - c. Shop Drawings
 - d. Instructions
 - e. Valve Charts

H. RESPONSIBILITY OF THE TAB FIRM

1. The TAB personnel shall check, adjust and balance the components of the air conditioning system which will result in optimum noise, temperature and air flow conditions in the conditioned spaces of the building while the equipment for the system is operating economically. This is intended to be accomplished after the system components are installed and operating as provided for in the contract documents, which is the responsibility of the project contractor.
2. The tests shall demonstrate the specified capacities and operation of all equipment and materials comprising the systems. Such tests shall be made as are deemed necessary by the Architect to indicate the fulfillment of the contract. The TAB firm shall then make available to the Engineer such instruments and technicians as are required for spot checks of the systems.
3. The TAB firm will not instruct or direct the contractor in any of the work. Any proposed changes or revisions in the work shall be submitted to the Architect in writing. The Architect will process the proposal as appropriate.

I. BALANCING SERVICES

1. The TAB firm, Architect and Owner will inspect the installation of heating and cooling pipe systems, sheet metal work, temperature controls and other component parts of the heating, air conditioning and ventilating systems. The inspection of the work will cover that part relating to proper arrangement and adequate provisions for the testing and balancing. The inspections shall be performed periodically as the work progresses.
2. Upon formal notification of completion of the installation and start-up of the mechanical equipment by the contractor, TAB firm will balance, test and adjust the system components to obtain optimum condition in each conditioned space in the building.
3. The TAB firm shall be responsible for inspecting, balancing, adjusting, testing and compiling the data on the performance of fans, all dampers in the duct systems, all air distribution devices or heat exchangers, and the water flow through all coils.
4. The TAB firm will, fourteen days prior to Final Inspection, as requested by the Owner prepare seven copies of the completed Test and Balance Report. The report shall be complete with logs, data and records as required herein and all logs, data and records shall be typed, produced on white bond paper and spiral bound. The report shall be certified accurate and complete by a principle engineer of the TAB firm. Transmit one copy directly to the Owner's Representative and the remaining six copies to the Architect. The Architect will review and approve the report. Upon approval, two copies will be submitted to the Owner's Representative and two copies transmitted to the Contractor.
5. Time of testing shall be coordinated with the Commissioning Agent who shall be present to observe and assist in the testing.

J. REPORT: After balancing is complete and before calling for final observation, record and submit for record, the following data:

1. Each CCU & FCU:
 - a. Total supply CFM in full cooling.
 - b. CFM of each outlet served by ducted unit.
 - c. Entering and leaving air temperature.
2. For each supply and exhaust fan:
 - a. Suction and discharge static pressure, total static pressure and total CFM.
 - b. Fan RPM measured by tachometer. Verify rotation.
 - c. Motor nameplate F.L.A., actual amps and voltage.
 - d. CFM of each outlet served by fan.
3. Each data value that cannot be balanced to meet scheduled design value:
 - a. List the cause of the discrepancy between the actual data and the design value.
 - b. List corrective action that must be taken to meet design value.
 - c. Note that "Not Operating" is not an acceptable entry into the Testing and Balancing report. If a piece of equipment is not operating during the testing and balancing process, TAB firm will contact Mechanical Contractor. Mechanical Contractor will repair system as required. TAB firm will then test and balance the system as specified.

K. REPORT APPROVAL

After report is submitted and reviewed by Engineer, Test and Balance Contractor shall meet Engineer at the site to review balancing problems and perform a random check of data values listed in report. Contractor shall bring all necessary testing and balancing equipment to site necessary to measure values.

L. AFTER OWNER OCCUPANCY:

1. After Owner has occupied and is using the building, make three additional inspections of the system during the one-year warranty period (at times directed by Owner) to:
 - a. Correct any Owner observed temperature imbalances.
 - b. Check correct operation of equipment and verify by letter to the Architect for each trip. List in the letter corrections made.
2. At the season opposite that of start up, inspect and verify correct operation of all systems. Make adjustments as required.

END OF SECTION

SECTION 23 07 00 - HVAC INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Install all insulation in conformance with manufacturer's recommendations and these specifications.
- B. Insulation materials manufactured by the following list of companies will be acceptable provided their materials conform to these specifications (see Paragraph on Substitution): Armstrong, CertainTeed, Childers, Foster, Insulphen, Knauf, Koolphen, Manville, Owens-Corning, Pabco, Pittsburg-Corning and SPI.
- C. Flame Spread and Smoke Requirements:
 - 1. All jackets, adhesives, coatings, insulating materials and vapor barrier mastics for air distribution systems shall meet the requirements of NFPA Bulletin 90-A with a flame spread of 25 or less and smoke developed rating not higher than 50.
 - 2. All jackets, adhesives, coatings, insulating materials and vapor barrier mastics for piping and equipment shall have a flame spread not higher than 25 and smoke developed rating not higher than 50.
 - 3. All materials containers shall have a U. L. Label.
- D. At each pipe support point, install a hard section of Koolphen K or Insulphen phenolic foam pipe insulation, minimum 18" length, on lower 180° of piping, 360° if clamps are used on top of pipe, same thickness as adjacent insulation, to prevent compression at support bearing area. Seal and finish to match adjoining insulation. Provide formed 16 gage galvanized sheetmetal saddles, same length as hard section, to completely cover hard section.
- E. Install .020" thick aluminum jacket with minimum 2" overlap joint on all insulated piping exposed outside building. Install factory made aluminum covers on all elbows. Cut aluminum neatly to fit all tees, such that all insulation is covered by aluminum. Use waterproofing aluminum colored Foster 95-44 sealer to seal all joints. Provide .020x3/4" aluminum bands not more than 12" on center for all jacketing. Install aluminum covers on insulated pipe inside that is exposed to view. Cover is required in mechanical or AHU rooms. Jacketing in contact with soil shall be .010" stainless steel.
- F. Greenguard Certification: Insulating materials shall have Greenguard certification.
- H. Submittals: Include all material and mastic data in the submittal including certifications and VOC information.

PART 2 - MATERIALS AND METHODS

2.1 CONDENSATE DRAINS

Insulate all condensate drain lines with 3/4" thick, closed cell foam insulation with a thermal conductivity (C value) of .27 at 75° F. Insulation shall have a maximum flame spread rating of 25 and a maximum smoke density rating of 50. Chemical composition of material shall not cause or accelerate corrosion or other deterioration of piping.

2.2 LAP AND JOINT ATTACHMENT

Self-sealing type jackets will be acceptable provided the laps are sealed per the manufacturers recommendations and the installation is 100% visually inspected by the insulation contractor's foreman.

2.3 REFRIGERANT PIPING

- A. GENERAL: Insulate all refrigerant piping.
- B. MATERIAL: 1.5" thick, closed cell foam insulation with a thermal conductivity (C value) of .27 at 75° F. Insulation shall have a maximum flame spread rating of 25 and a maximum smoke density rating of 50. Chemical composition of material shall not cause or accelerate corrosion or other deterioration of piping.
- C. INSTALLATION: Install insulation in accordance with the manufacturer's recommendations using pre-glued slits and butt joints. Visually inspect joints and touchup as necessary with the manufacturer's recommended adhesive. Insulation without pre-glued factory slits shall be installed over piping during fabrication then glued together. Provide UV protective coating for insulation installed outside and cover with aluminum jacketing.
- D. MANUFACTURER: Armaflex, Rubatex or ImcoLock by IMCOA

2.4 DUCT INSULATION

- A. GENERAL: Externally insulate all supply air ducts (except as required for sound control) and outside air ductwork, kitchen hood supply air ducts and dryer vent. Insulate exhaust ducts down stream of inline fan backdraft damper.
- B. DUCTS INSIDE: 2" thick, fiberglass flexible duct insulation, 1 pound density (Type 100), conductivity (k) value not more than 0.27 at 75° mean temperature difference with an installed R value of 6 or higher, with factory adhered reinforced foil faced flame resistant Kraft paper vapor barrier. Wrap around duct with minimum lap of 2 inches each way, staple with 1/2" outward clinch staples 2" on center, secure on bottom of duct with fire retardant adhesive (Foster 85-15). For ducts 24" to 30" wide, provide one row of pins on bottom of duct, 16" on center. For wider ducts provide one row on bottom of duct for each 16" of width. Trim pins flush with retainer disk. For ducts in mechanical rooms, reduce spacing to 12" on center for each 12" of dimension (all sides of duct). Seal joints and seams with 3" wide FSK foil tape, including termination of flex ducts. Where insulation terminates at equipment (AHU, fan coil, VAV box, etc) and where insulation is custom fitted to transitions and elbows, add glass cloth strip adhered with Foster 30-35 between equipment and insulation cover.

END OF SECTION

SECTION 23 20 00 - HVAC PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

- A. Construct all piping systems in accordance with applicable ASME Codes. Provide a vent valve at the topmost part and a drain valve at the lowest part of all water piping systems.
- B. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space. Provide unions, flanges and shutoff valves to allow removal of the equipment and its subassemblies without having to remove excessive amounts of building piping or drain water systems. Bull head Tee arrangement is not acceptable.
- C. Provide pipe markers per Miscellaneous Equipment and Requirements, Section 15950.

PART 2 - METHODS

2.01 PIPE SUPPORTS

- A. GENERAL: Provide supports of adequate strength for all piping. Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than two feet horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion. The minimum size hanger rod shall be 3/8".
- B. HORIZONTAL PIPING:
 - 1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

<u>Pipe Size</u>	<u>Steel Pipe</u>	<u>Other Pipe</u>
1" & Smaller	6 Feet	4 Feet
1¼" & 1½"	8 Feet	5 Feet
2"	8 Feet	5 Feet
2½" to 4"	8 Feet	6 Feet

Multiple parallel runs of piping shall be supported from every joist and beam the piping crosses. Where piping runs parallel to structure support from three adjacent joists or beams.

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap.
3. HANGERS: Manufactured by Grinnell or Tolco.
 - a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.
 - b. MULTIPLE RUNS: Trapeze hangers.
 - c. BEAM CLAMPS: Grinnell Figure 92 except use Figure 228 for pipes 6" and larger.
4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced. Unless described by detail on the drawings, provide Tolco Pipe Pier Supports four foot on center to support condensate piping on the roof. Select for proper weight loading.
5. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel. Provide solid copper supports for copper piping, or install gas wrap insulating tape on pipe at support point.
6. PIPE SADDLES: Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16" minimum length. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.
7. TRAPEZE SUPPORTS: Shall consist of unistrut or channel with 3/8" thick or heavier all thread rods attached to structure. Provide double nuts and cut all tread so no more than 1" extends beyond nut.

2.02 VALVE INSTALLATION

Install in accessible locations, to make possible removal of bonnet and complete servicing of each valve. Do not install valve with stem down. Provide access panels of adequate size per Miscellaneous Equipment and Requirements, Section 15950.

2.03 TESTING PIPING SYSTEMS

- A. GENERAL: Test all piping systems to assure that they are absolutely leak free. Pipe to be insulated shall be proved leak free before pipe is concealed. Architect shall be notified when testing is performed so that the Engineer and/or Owner may observe and certify the results.
- B. PRESSURE TEST METHOD: Use method as required by the equipment manufacturer for the refrigerant system to meet their warranty and start/up requirement. During this test period, inspect all pipe fittings and accessories in the piping and eliminate all leaks.

2.04 SLEEVES

Provide sleeves for all piping passing through walls, floors not on grade and roof slabs. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Provide vented sleeves for all gas piping below floor slabs or paved areas.

2.05 PLATES

Provide chromium plated wall and ceiling plates for all exposed piping, at point piping passes through walls or ceilings. Plates shall be large enough to completely cover pipe sleeves. On insulated piping, inside diameter of plates shall just exceed outside diameter of pipe covering. Plates may be omitted for pipe sizes larger than 6".

2.06 VALVE AND FITTING SIZES

All hand valves, fittings and other piping accessories shall be size of the line in which installed unless specifically indicated otherwise on the Drawings.

2.07 DIELECTRIC UNIONS

Provide dielectric insulating unions at all connections between dissimilar metals.

2.08 FITTINGS

- A. SCREWED: Conform to ANSI Specification B16.3.
- B. COPPER: Conform to ANSI Specification B16.22.
- C. WELDED: Install elbow, transition, branch and weld-o-let lateral fittings in welded systems. Mitered or field fabricated fittings are not acceptable. Flanges shall be weld neck type for sizes 6" and larger pipe.
- D. SPECIAL: Use long radius ells on all pumped lines.

2.09 MISCELLANEOUS PIPING

- A. GENERAL: Provide all required piping not specifically shown on the drawings but necessary for the proper operation of the systems. Piping materials, methods of installation, fittings, valves, etc., shall conform, in general, to that specified for similar piping systems.
- B. CONDENSATE DRAINS: From each air conditioning cooling coil drain pan to drain indicated, or to a suitable drain point if not indicated. All lines graded down in direction of flow. Provide trap of height required for air seal. Provide screw plug cleanout at change of direction to allow rodding.

PART 3 - MATERIALS

3.01 CONDENSATE DRAIN PIPING

Type "L" copper, similar to refrigerant piping.

3.02 REFRIGERANT PIPING

- A. GENERAL: Provide for the systems as shown. Submit shop drawing of piping system showing all traps, pipe sizes, and accessories: drawing to be marked "Approved", and signed by an employee of the Application Engineering Department of the unit manufacturer. Do not install piping until this drawing is submitted and approved.
- B. MATERIALS:
 - 1. PIPE: Type "L" copper ACR tubing.
 - 2. FITTINGS: Wrought copper streamlined, long radius sweat fitting.
 - 3. SOLDER: Sil-Fos, except on valves use solder recommended by valve Manufacturer. Make joints while pipe is under nitrogen purge to prevent formation of oxides inside piping.
- C. EVACUATION: Completely evacuated of all moisture by applying vacuum pump for a minimum of 24 hours. Moisture indicator must indicate a completely moisture-free condition at a time of final inspection. Vacuum must be maintained at 50 microns to completely dry system and remove non-condensables.
- D. ACCESSORIES: Replaceable core type liquid line dryer-strainer sized for system capacity at 2 PSI pressure drop per ARI Standard 710-64, sight glass-moisture indicator, expansion valves, solenoid valves and charging fittings.
- E. DIELECTRIC: Insulate copper pipe from all dissimilar metals, hangers, pipe, etc., with 4 pound/square foot lead shields 6" long wrapped completely around the pipe and placed between hangers and pipe, or elastomeric snubbers of similar design. B-line B1999 vibra cushion and B2000 two piece clamp.

END OF SECTION

SECTION 23 31 00 – HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 - MATERIALS AND METHODS

2.1 DUCTWORK

- A. Furnish and install all supply, return, exhaust, outside air and other ductwork shown, together with splitters, extractors, dampers, etc. All ductwork, supports, bracing, etc. shall be constructed of new grade, lock forming quality, G-60 or better galvanized steel sheets.
- B. Dimensions of duct work shown on Drawings are inside air stream dimensions. Allowances have not been made for duct insulation.
- C. Provide adjustable extractors with quadrant lock mechanism equal to Titus AG-45 at all supply outlet taps into trunk duct. Provide conical tap with damper and raised quadrant lock for flexible duct taps, reference detail on the Drawings.
- D. Ductwork shall conform with current edition of SMACNA "Duct Manual and Sheet Metal Construction for Ventilating and Air Conditioning System" and the National Board of Fire Underwriters Pamphlet 90A, plus more stringent requirements of these Specifications. Adjust location of standing seams to clear structural members.
- E. Duct connections to air handling units and fans shall match the outlet/inlet size, or as recommended by the equipment manufacture, including straight lengths of duct before transitions, to minimize system effect losses. Where duct adapters or damper trays are provided with roof fans, duct connections shall match size for a minimum of 36" before elbow or transition.
- F. All duct transitions shall be gradual with a 15° maximum angle as measured from centerline of duct. This includes angled offset, mitered offset, eccentric transition and concentric transition (2 x 15°).
- G. Ductwork shall be constructed to operate at the pressure as specified under "external static pressure" of the associated air handling unit and fan schedule. Ductwork downstream of VAV boxes and fan coil unit shall be 1" static class ductwork. Ductwork operating at .75 to 2.0" shall be 2.0" pressure rated. Primary ductwork from a variable air volume air handling unit shall be constructed in accordance with Section 2.2 Medium Pressure Ductwork.
- H. Square turns shall be equipped with airfoil turning vanes built to SMACNA Standards. Provide radius turns for elbows less than 90°.
- I. Support ductwork with 1" wide x 20 gage galvanized steel straps; 6'-0" maximum centers but not more than allowed by SMACNA. Connect strap to duct with two sheet metal screws on each side of duct and one on bottom. Exposed ducts shall be supported in a manner to provide a finished appearance.

- J. Install duct braces in duct openings to hold shape of duct until grilles, registers and/or diffusers are installed. Then remove duct brace.
- K. Seal all duct joints, adjustable elbows and spin-in taps with Design Polymerics DP1010 or Hardcast IG601 Iron Grip installed full strength (no dilution). Ductwork subject to moisture and not required to be welded, shall be sealed with Benjamin Foster 3214.
- L. The minimum distance between the FCU and the first tap shall be 54". The minimum distance between taps on the same side of the duct shall be 54".
- M. Provide equivalent sized duct of different aspect ratio to accommodate ceiling cavity conditions.
- N. Sheet metal contractor shall install control system and fire alarm system devices that are attached to ductwork. This includes control dampers, sensors and duct smoke detectors.
- O. The Contractor shall ensure that all ductwork either stored on site or installed in the building is thoroughly sealed to protect against dirt and moisture until such time that the building is deemed by the Owner to be adequately clean to allow for start-up of the associated air handling equipment. Should ductwork not be sealed as specified, then the Contractor shall have such ductwork professionally cleaned to an as-new condition at no cost to the owner.

2.2 DUCTWORK FOR OUTSIDE AIR HOODS AND FANS

Where hoods or fans are shown open to mechanical room, shop, etc., provide short length of duct to allow installation of OBD and/or motorized control damper. Duct dimension shall be roof curb opening size or larger if required by damper size.

2.5 PLENUMS AND BLANK-OFF PLATES

- A. Provide plenums at louvers, air handling units, fan coil units and other equipment where return air or outside air ducts are shown to connect. Provide plenums for the mounting fans to louvers. Provide full or partial blank-off plates on return air openings as necessary for properly balancing of system supply air, outside air and return air flows or to cover openings where air transfer is not desired.
- B. Construct plenums with galvanized steel framing members and galvanized sheet steel, cross broken or rigidly braced with galvanized angles. Gages and bracing shall conform to SMACNA recommendations for ductwork of like size. Openings for fans, access doors, etc., shall be framed with galvanized steel angles.
- C. Where access doors are shown, provide hinged doors with #202 Ventlok latch.

2.6 SHEET METAL SHOP DRAWINGS

Prior to fabrication of any sheet metal, submit Shop Drawings for all ductwork, showing coordination of mechanical, electrical, plumbing and structural components. All crafts shall sign off on final drawings. The shop drawing shall include a construction details booklet (multiple copies), one blueline set of drawings and one reproducible set of drawings. The booklets and reproducible set with comments noted will be returned. Contractor shall provide blueline sets of drawings from the reproducible set for distribution to Owner, Architect and others.

2.7 SCREENS

Furnish and install screen on all duct, fan, etc., openings which lead to or are outdoors. Screens shall be No. 16 gage, galvanized steel 1/2" mesh bolted into removable galvanized steel frame. Install screens over return air openings between floors.

2.8 CONNECTIONS TO LOUVERS

All connections to louvers shall be in a manner that will be watertight. Ductwork behind louver for a minimum of three feet shall have watertight soldered joints and shall be sloped to weep holes in bottom of louver. Duct shall be lapped over bottom louver blade where possible. Make connections to aluminum louvers with dielectric connections. See Louver Detail on plan and Division 08 for additional information.

2.9 METAL CLOSURES

- A. Provide metal closures around all openings in floors or walls through which ducts or piping are passing.
- B. Build 3" high by 3" wide concrete "dam" around duct or return air penetrations of mechanical room floors above grade. Floor return air openings without sound attenuator attached shall be covered with 1" x 1/8" welded steel bar grating supported by 2" x 2" x 1/4" angles attached to slab with 3/4" round drilled anchors, 24" on center.
- C. MATERIALS:
 - 1. Where no fire rating required, and where no fire dampers installed: 18 gage galvanized sheet metal.
 - 2. Where fire rating required or where fire damper is installed: Gage of sleeves shall be as required by the conditions of U. L. listing, but not less than the gage of duct. Minimum 18 gage. Install 1/2" x 1/2" x 1/8" angles around duct on both sides of wall or floor penetration.
 - 3. Sleeves for floor pipe penetrations above grade shall be a section of Schedule 40 steel pipe extending 3" above finished floor and sealed watertight.

2.10 SADDLES

Provide sheet metal protective saddles at all pipe supports for insulated piping. Refer to Insulation Section.

2.11 INSTALLATION OF DUCTWORK AND AIR DEVICES

- A. Prior to all work of this section, Carefully inspect the installed work of all other trades and verify that all such work is complete to the point where fabrication and installation of the work of this section may properly commence.
- B. Verify the location of all ducts, structure, piping and equipment. Coordinate the routing of all work with that of other trades prior to installation. Verify that all ductwork will fit spaces indicated prior to fabrication or installation of any ductwork.

- C. Exact location of all registers, grilles or ceiling outlets shall be verified by the Architect before roughing-in. Reference shall be made to reflected ceiling plan in locating ceiling outlets.
- D. Ducts shall be installed in a neat and workmanlike manner.

2.13 ADJUSTMENTS AND CORRECTIONS

Balance all systems of ductwork including exhaust systems to obtain the air quantities indicated for each inlet and outlet. Air quantities shall be further adjusted as required to obtain uniform temperatures in the spaces.

END OF SECTION

SECTION 23 31 10 – AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 SUBMITTALS

- A. Provide submittals as outlined in Section 23 00 00 General HVAC

PART 2 - PRODUCTS

2.1 DAMPERS

- A. **GENERAL:** Provide dampers where shown on Drawings and wherever necessary for complete control of air flow, including all supply and outside air ducts. Provide multi-blade volume dampers in all zone ducts at multi-zone air handling units. Where access to dampers through a suspended ceiling is necessary, coordinate the proper location of the access doors. Install, mount and connect into ductwork all control dampers furnished under the control contractors supervision.
- B. **SPLITTER DAMPERS:** Shall be constructed of single thickness, 16 gauge galvanized steel, hinged at leaving edge and founded at entering edge, securely riveted or welded to a square operating rod. The length of the splitter damper blade shall be 1½ times the width of the split in the main duct, but not less than 12".
- C. **VOLUME DAMPERS:** Factory constructed of 16 gage galvanized steel for frame and blades. Blades shall not exceed 48" in length or 6" in width, and shall be of the opposed interlocking type. The blades shall be supported on 1/2" diameter rust-proofed axles. Axle bearings shall be self-lubricating ferrule type.
- D. **FLEX TAP CONNECTIONS:** Taps on rectangular low pressure ducts for flexible connections to diffusers, etc shall be 22 gauge, round conical taps with adjustable single blade damper. Damper rod shall be continuous though tap with blade mechanically attached. Provide bearings at each end, and quadrant lock operator with wingnut and 2" standoff bracket for insulation. Refer to detail on the drawings for additional construction details.
- E. **DAMPER ADJUSTING DEVICES:** Each splitter or volume damper shall be fitted with an adjusting device extending beyond external duct insulation.
 - 1. **ACCESSIBLE CEILINGS:** Ventlok #641 regulators attached directly to duct and location marked in ceiling as approved.
 - 2. **NON-ACCESSIBLE CEILING:** Regulators exposed. Ventlok #666 rods and #607 end bearings.

2.2 FIRE DAMPERS

- A. Install fire dampers in all duct penetrations and return air openings in fire rated walls, ceilings, floors and chases. Provide fire damper at each sidewall register or grille. Provide additional fire dampers where specified by local building codes and also where shown on drawings.
- B. Construction shall conform to requirements of NFPA Pamphlet No. 90A with recommended steel sleeves, fusible links, spring catches, non-corrosive bearings, etc., and shall be U. L. labeled.
- C. Fire dampers shall be shutter type providing minimum restriction to air flow. Provide Type B for ducts passing through walls. Provide thinline Type A dampers at sidewall registers. Provide Type B (or Type A of equal free area) dampers at wall openings. Select damper thickness to fit within the thickness of the wall with OBD's or other specified devices. Dampers located in medium pressure ducts shall be compatible with this construction including the specified maximum leakage rate. Install dampers in accordance with conditions of their U. L. listing.
- D. Air devices in U. L. fire rated ceilings shall have compatible U. L. classified ceiling dampers with volume adjustment mechanism and extension collar equal to Ruskin CFD-A. Install complete system including thermal blanket on back of air device in accordance with the U. L. listing.
- E. Acceptable Manufacturers: Greenheck, Nailor, Pottoroff, Ruskin and Safe-Air

2.3 ACCESS DOORS TO FIRE DAMPERS

- A. Provide double wall galvanized steel, insulated access door in duct for inspection and service to fire damper and fusible link. Minimum size shall be 16"x16" with four cam latches unless limited by duct size. Access doors in stainless steel ducts shall be constructed of stainless steel.
- B. Construct access door airtight and conform to recommendations of NFPA and SMACNA.
- C. Opening of access panel shall be within 12" of the damper to allow resetting of the actuator.

2.4 FLEXIBLE DUCT

Flexible duct shall be U. L. Listed 181 Class I air duct with fiberglass/aluminum foil inner liner, fiberglass insulation with a C=.23, bi-directional reinforced metalized vapor barrier outer jacket and 6" w.c. pressure rating. The insulating value shall be meet the International Energy Code, minimum R=6. The maximum length between duct and air device shall be six feet. Flexmaster Type 1M or Thermaflex M-KE. Connect inner liner to duct tap, round rigid duct or air device with stainless steel, adjustable bands (hose clamps). Secure outer cover with nylon wire tie strap. Tape edges of outer cover to adjacent insulation or duct with FSK foil tape to present a finished appearance.

2.6 FLEXIBLE CONNECTIONS BETWEEN FCU OR FAN AND DUCTWORK

Flexible connections shall be made from neoprene coated, woven glass fiber material, 30 ounce per square yard, installed air tight with at least 1" slack to insure that no vibration is transmitted from fan to ductwork. Air handling units with fans that are internally isolated from the housing do not require flexible connections.

2.7 ACOUSTICAL LINER

- A. GENERAL: Provide 1" thick acoustical lining in return air ducts and return air plenums. Do not install in any supply air duct or kitchen return air duct.
- B. MATERIAL: Owens-Corning "Aeroflex Duct Liner" or equivalent by CertainTeed; 1½ pound per cubic foot density, neoprene faced, "K" value not more than .27 at 75° F mean temperature difference.
- C. INSTALLATION: Adhere liner, with coated side toward air stream, to all interior sides of duct with 100% coverage of Foster 85-11. Further secure the liner with mechanical fasteners on maximum 12" centers. All edges and fasteners shall be coated with one brush coat of Foster 30-35.
- D. PLENUMS: Plenum interiors exposed to view through louvers and grilles shall be lined and have pins painted flat black.

PART 3 - EXECUTION

- 3.1 Installation shall comply with manufacturer's requirements and installation details on the Drawings.
- 3.2 Install backdraft and control dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- 3.3 Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
 - A. In ductwork before and after coils, filters, fans and dampers.
 - B. Upstream from turning vanes.
 - C. Upstream or downstream from duct silencers installed in ducts.

END OF SECTION

SECTION 23 34 00 - HVAC FANS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 SUBMITTALS

- A. Provide submittals as outlined in Section 23 00 00 General HVAC

PART 2 - PRODUCTS

2.1 MISCELLANEOUS FANS

- A. **GENERAL:** All fans shall be AMCA rated for air and sound. Each fan shall have fan blade and drive guards, disconnect switch and mounting isolators where applicable. Belt drive fans shall have adjustable motor base plates and adjustable cast iron drives sized for 150% of motor horsepower. Dampers shall be aluminum construction with stainless steel shafts and Teflon bushings. Fans and their accessories shall be a prewired assembly from the factory for single point connection by the electrical subcontractor.
- B. **INLINE FANS:** Direct or belt drive as noted with fan wheel and motor assembly mounted on hinged side access panel. Fan wheel shall be aluminum backward inclined, non-overloading centrifugal type with matching deep venturi cone. Interior of housing shall be fiberglass insulated for sound attenuation. Provide automatic belt tensioner and fan installation hardware for application shown.
- C. **ACCEPTABLE MANUFACTURERS:** Cook, Greenheck, Penn Barry and Twin City Fans

PART 3 - EXECUTION

- 3.1 Installation shall comply with manufacturer's requirements and installation details on the Drawings.

END OF SECTION

SECTION 23 37 00 – DIFFUSERS REGISTERS AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 SUBMITTALS

- A. Provide submittals as outlined in Section 23 00 00 General Mechanical

PART 2 - PRODUCTS

2.1 AIR DEVICES

- A. Furnish and install louvers, supply, return and exhaust registers, grilles and outlets shown on the Drawings.
- B. All devices shall be all aluminum construction and shall have white finish. Aluminized type corrosion resistant steel with finish having a five year warranty against the formation of visible rust will also be acceptable. Devices in U. L. fire rated ceilings shall be of aluminized steel construction with white finish, suitable for U. L. classification.
- C. All supply outlets shall be equipped with opposed blade volume dampers. Provide Titus Model D-75 for supply diffusers.
- D. The air distribution equipment supplier shall guarantee that each supply, return and exhaust device shall be of the proper design and size to pass the indicated quantity of air into or out of the space involved, with maximum diffusion and without objectionable noise, excessive friction or objectionable air movement at the occupied level.
- E. Registers, grilles and outlets shall be of manufacture, type and capacity as shown on the schedule of the Drawings. Similar devices of other manufacture may be submitted for approval for those items for which a reasonable close substitute is available. Devices must be similar in appearance and their style must be acceptable to the Architect.
- F. If devices other than those shown are proposed, the values for their face velocities, neck velocities and noise levels, DBA or NC, shall not exceed these values for the devices scheduled on the Drawings.
- G. Ceiling outlets shall be of a type compatible with the ceiling in which they are installed and shall have removable core with overlapping cone design to prevent vertical downward projection of air.
- H. Contractor shall check the Architectural Drawings and verify the type of ceiling shown in the various areas to determine the proper type of outlet for the ceiling used.

- I. Air devices in U. L. fire rated ceilings shall have compatible U. L. classified ceiling dampers with volume adjustment mechanism and have U. L. approved fireproofing on device. Dampers connected to flexible ducts shall also have extension collar feature equal to Ruskin CFD-A. Sidewall registers shall have thinline fire damper. Fire proofing devices shall contain no friable or fibrous material in the air stream.
- J. ACCEPTABLE MANUFACTURERS: Krueger, Metalaire, Nailor, Price, Titus, Tuttle & Bailey.

PART 3 - EXECUTION

- 3.1 Installation shall comply with manufacturer's requirements and installation details on the Drawings.

END OF SECTION

SECTION 23 41 00 – PARTICULATE AIR FILTRATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 SUBMITTALS

- A. Provide submittals as outlined in Section 23 00 00 General HVAC

PART 2 - PRODUCTS

2.1 AIR FILTERS

- A. **GENERAL:** Provide complete sets of air filters for all supply air handling equipment for use during construction. Protect filters during construction with an overlay of polyester filter media. Replace overlay filter media and filters during construction as necessary to protect coils. Install a set of new filters prior to Testing and Balancing of the system. Install a final set of new filters at Substantial Completion.
- B. **FILTER MEDIA:** Farr Type 30-30 MERV 8 efficiency when tested according to ASHRAE 52.2., pleated, disposable type filter, 2" thick, suitable for face velocity up to 350 FPM with initial resistance not more than .17" w.g. at that velocity. Use .5" w.g. resistance in fan motor selection. Adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

- 3.1 Installation shall comply with manufacturer's requirements and installation details on the Drawings.

END OF SECTION

SECTION 23 63 00 – DUCTLESS DX-SPLIT SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

Provide motor starters and controllers for motors provided under this Section. Refer to Section Miscellaneous Equipment and Requirements for starter and motor requirements. Equipment and accessories shall be prewired at the factory for single point connection by the electrical subcontractor.

1.03 EQUIPMENT NAMEPLATES

Each piece of equipment shall have a nameplate identifying manufacturer, model number, serial number, voltage, phase, amperage, refrigerant type, etc. as applicable. For units outside, nameplate shall be stainless steel or have a protective cover to prevent sun fading.

PART 2 - MATERIALS AND METHODS

2.01 DUCTLESS SPLIT SYSTEM

- A. **GENERAL:** System shall consist of outdoor condensing unit connected to one or more duct free, wall or ceiling mounted fan coil units. System shall be designed to operate as a unit complete with microprocessor control system.
- B. **AIR COOLED CONDENSING UNIT**
 - 1. **HOUSING:** Cabinet shall be constructed of galvanized steel, bonderized and coated with baked-enamel finish. Provide access panels for ease of service.
 - 2. **COMPRESSOR:** Fully hermetic reciprocating or scroll type operating with R-22 refrigerant. Unit shall have internal protection for over temperature and over current. Provide crankcase heater. Refrigeration system shall have gage ports, service valves, accumulator, filter dryer and pressure relief. Heat pump units shall have reversing valve and heating mode metering device.
 - 3. **CONDENSER FAN:** Direct drive propeller type with internally protected, totally enclosed motor.
 - 4. **CONTROLS AND SAFETIES:** Unit shall have time delay restart, automatic restart on power failure, safety lockout, high and low pressure safeties.

C. EVAPORATOR UNIT

1. GENERAL: Indoor, ceiling or wall mounted, direct expansion fan coil unit complete with electric controls, microprocessor control system and integral temperature sensing.
2. FAN: Direct drive tangential blower with automatic motor-driven vertical air sweep. Fan motor shall be three speed type.
3. COIL: Copper tube aluminum fin with refrigerant metering device. Provide condensate drain pan and drip pan under headers.
4. CONTROLS: Shall be microprocessor-based and control space temperature, determine optimum fan speed and run self-diagnostics. Provide remote wireless controller for programming and temperature adjustment.
5. FILTERS: Factory supplied, permanent cleanable type with rack.

D. ACCEPTABLE MANUFACTURERS: Daikin, Carrier, LG, Mitsubishi and Sanyo.

END OF SECTION

SECTION 23 65 00 – VARIABLE REFRIGERANT VOLUME DX SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes split-system air-conditioning and heat pump units consisting of multiple evaporator-fan and variable capacity compressor-condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

1.2 SUBMITTALS

- A. Product Data: For each unit indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics including:
 - 1. Piping schematics with intended piping line lengths indicated on the drawings (piping plan to be coordinated between manufacturer and contractor prior to submittal. Generic piping schematics are not acceptable). The manufacturer shall include notes on the piping schematics indicating locations where expansion loops shall be installed.
 - 2. Wiring schematics showing electrical connection requirements, and field control wiring terminations.
 - 3. Field refrigerant charge volume shall be noted along with factory charge. Note schedule limitations.
 - 4. Manufacturer's performance data shall reflect specified conditions. Nominal capacities are not acceptable. Ratings shall allow for piping lengths, scheduled ambient temperatures, etc.
- B. Operation and maintenance data.
- C. Contractor must have completed the manufacturer's installation training. The contractor shall submit a copy of the training completion certificate for the project manager and at least 2 pipe installers with this submittal.

1.3 QUALITY ASSURANCE

- A. The units shall be listed by the Electrical Laboratories (ETL) and bear the cETL label.
- B. All wiring shall be in accordance with the National Electric Code (NEC).
- C. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings." Provide certified efficiency ratings per AHRI-1230 standard. (DOE Waiver is not acceptable) Scheduled EER and IEER ratings scheduled shall be considered minimum efficiency allowed.
- D. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings." Provide certified efficiency ratings per AHRI-1230 standard. (DOE Waiver is not acceptable) Scheduled COP ratings scheduled shall be considered minimum efficiency allowed.
- E. Units shall be designed to operate with HCFC-free refrigerants.

1.4 WARRANTY

- A. All VRF equipment and controls shall be warranted by the manufacturer for a period of 5 years from the date of startup. (Startup not to exceed 6 months from delivery). The warranty shall include both parts and labor and refrigerant. The condensing units shall include an additional 5 years (total of 10 years) of parts only warranty covering the entire condensing unit.
- B. All warranty shall be executed by the manufacturer's authorized representative. Contractor warranty shall not be allowed.
- C. Copies of the warranty paperwork and startup documentation shall be submitted upon close out of the installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Daikin AC – basis of design.
- B. Subject to compliance with project requirements, equivalent products by Carrier/Toshiba, LG, Mitsubishi/Trane are acceptable.

2.2 GENERAL DESCRIPTION

- A. The variable capacity, heat recovery and/or heat pump air conditioning system shall be a Variable Refrigerant Volume (heat and cool model) split system as specified. The system shall consist of multiple evaporators, branch selector boxes, manufacturer supplied refrigerant joints and headers, a two or three pipe refrigeration distribution system using PID control, and matched variable speed outdoor condensing units. The outdoor unit is a direct expansion (DX), air-cooled heat recovery/heat pump, multi-zone air-conditioning system with variable speed driven compressors using R-410A refrigerant. All zones are each capable of operating separately with individual temperature control.
- B. Where heat recovery is specified, operation of the system shall permit either individual cooling or heating of each fan coil simultaneously or all of the fan coil units associated with one branch cool/heat selector box. See drawings for Branch Selector locations and associated fan coil units.
- C. Branch selector (BS) boxes shall be located as shown on the drawing. The branch selector boxes shall have the capacity to control up to 96 MBH (cooling) down stream of the BS box. The BS box shall consist of five electronic expansion valves, refrigerant control piping and electronics to facilitate communications between the BS box and main processor and between the BS box and fan coils. The BS box shall control the operational mode of the subordinate fan coils. The use of five EXV's ensures continuous heating during defrost, no heating impact during changeover and reduced sound levels. If solenoid valves in the selector box cause a "clicking" sound upon changeover, then the contractor shall be required to provide additional acoustic wrapping of the box until sound levels are acceptable to the owner and engineer.
- D. The indoor units shall be connected to the condensing unit utilizing manufacturer specified piping joints and headers to ensure correct refrigerant flow and balancing. T style joints are not acceptable. All joints shall be installed per manufacturer's instructions.

- E. Equipment capacities to meet leaving air temperatures (LAT) and Total and Sensible capacities as scheduled.

2.3 EVAPORATOR-FAN UNIT – HORIZONTAL DUCTED

- A. Concealed Horizontal Ducted Unit Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.
- B. Indoor unit shall be a built-in ceiling concealed fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, direct-drive DC (ECM) type fan with auto CFM adjustment at commissioning, for installation into the ceiling cavity. It is constructed of a galvanized steel casing. It shall be available in capacities scheduled. It shall be a horizontal discharge air with horizontal return air configuration. All models feature a low height cabinet making them applicable to ceiling pockets that tend to be shallow. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. Included as standard equipment, a condensate drain pan and drain pump kit that pumps to 18-3/8" from the drain pipe opening.
- C. INDOOR UNIT:
 - 1. The indoor unit shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall be equipment with automatically adjusting external static pressure logic that is selectable during commissioning. This adjusts the airflow based on the installed external static pressure.
 - 2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
 - 3. All refrigerant lines shall be insulated from the outdoor unit.
 - 4. The indoor units shall be equipped with a condensate pan and condensate pump. The condensate pump provides up to 18-3/8" of lift from the center of the drain outlet.
 - 5. The indoor units shall be equipped with a return air thermistor.
 - 6. The indoor unit will be powered with 208V/1-phase/60Hz. (single point)
 - 7. The voltage range will be 253 volts maximum and 187 volts minimum.
- D. UNIT CABINET:
 - 1. The cabinet shall be located into the ceiling and ducted to the supply and return openings.
 - 2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
- E. FAN:
 - 1. The fan shall be direct-drive DC (ECM) type fan, statically and dynamically balanced impeller with three fan speeds available.
 - 2. The unit shall be equipment with an automatically adjusting external static pressure logic selectable during commissioning.
 - 3. The fan motor shall operate on 208 volts, 1 phase, 60 hertz with a motor output range of 0.12 to 0.47 HP respectively.
 - 4. The airflow rate shall be available in three settings.
 - 5. The fan motor shall be thermally protected.
 - 6. The fan motor shall be equipped as standard with adjustable external static pressure (ESP) settings.
- F. COIL:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. The coil shall be a 3 row cross fin copper evaporator coil with 13 fpi design completely factory tested.
4. The refrigerant connections shall be flare connections and the condensate will be 1-1/4" outside diameter PVC.
5. A condensate pan shall be located under the coil.
6. A condensate pump with a 18-3/8" lift shall be located below the coil in the condensate pan with a built in safety alarm.
7. A thermistor will be located on the liquid and gas line.

G. ELECTRICAL:

1. A separate single point power supply will be required of 208 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

H. FILTERS:

1. The units shall be provided with an accessory rear return filter housing (field installed). If filter return grills are indicated on the drawing then this accessory is not required.
2. Provide minimum MERV 8 filter during construction. Contractor to install clean MERV 13 filters just prior to owner acceptance.

2.1 EVAPORATOR-FAN UNIT – DUCTLESS CASSETTE

- A. Ceiling cassette fan coil units shall be equipped with an electronic expansion valve for installation into the ceiling cavity. It shall be a round flow air distribution type. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition.
- B. The indoor unit shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate drain pump, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.
- C. Return air shall be through the concentric panel, which includes a resin net, mold resistant, antibacterial filter.
- D. The indoor units shall be equipped with a condensate pan with antibacterial treatment and condensate pump. The condensate pump provides up to 20" of lift and has a built in safety shutoff and alarm.
- E. Units shall be equipped with a return air thermistor.
- F. Units shall utilize a factory mounted occupancy sensor. The occupancy sensor shall enable a setpoint reset function for energy savings by allowing the Owner to change the setpoint based on both occupied and unoccupied times. This requirement shall be by the VRF equipment provider and not by BAS.

2.2 WALL MOUNTED FAN COIL UNIT

- A. General: indoor unit shall be a wall mounted fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation onto a wall within a conditioned space. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. A mildew-proof, polystyrene condensate drain pan and resin net mold resistant filter shall be included as standard equipment. The indoor units sound pressure shall range from 31 dB(A) to 41 dB(A) at low speed measured at 3.3 feet below and from the unit.
- B. Performance: Each unit's performance is per the scheduled capacities.
- C. Indoor Unit:
1. The indoor unit shall be factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The front grille shall be easily removed for washing. The discharge angle shall automatically set at the same angle as the previous operation upon restart. The drain pipe can be fitted to from either left or right sides.
 2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
 3. Both refrigerant lines shall be insulated from the outdoor unit.
 4. Return air shall be through a resin net mold resistant filter.
 5. The indoor units shall be equipped with a condensate pan.
 6. The indoor units shall be equipped with a return air thermistor.
 7. The indoor unit will be separately powered with 208V/1-phase/60Hz.
 8. The voltage range will be 253 volts maximum and 187 volts minimum.
- D. Unit Cabinet:
1. The cabinet shall be affixed to a factory supplied wall mounting template and located in the conditioned space.
 2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
- E. Fan:
1. The fan shall be a direct-drive cross-flow fan, statically and dynamically balanced impeller with high and low fan speeds available.
 2. The fan motor shall operate on 208 volts, 1 phase, 60 hertz with a motor output range 0.054 to 0.058 HP.
 3. The airflow rate shall be available in high and low settings.
 4. The fan motor shall be thermally protected.
- F. Coil:
1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
 2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
 3. The refrigerant connections shall be flare connections and the condensate will be 11/16 inch outside diameter PVC.
 4. A thermistor will be located on the liquid and gas line.
 5. A condensate pan shall be located in the unit.

2.3 AIR-COOLED VARIABLE REFRIGERANT VOLUME CONDENSING UNIT

- A. Outdoor units shall be provided for either 460/3/60 as scheduled.
- B. VFD Inverter Control – Each condensing unit shall use a high efficiency, variable speed “inverter” compressor coupled with inverter fan motors for superior part load performance. Compressor capacity shall be modulated automatically to maintain constant suction and condensing pressures while varying the refrigerant volume for the needs of the cooling or heating loads.
- C. Systems shall use a field installed 16 or 18 AWG, 2-wire, stranded, non-shielded and non-polarized daisy chain control wiring to interconnect the condensing units, branch selectors, and fan coil units.
- D. Systems shall include a self diagnostic, auto-check function to detect a malfunction and display the type and location.
- E. Condensing unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports, and refrigerant regulator.
- F. Units shall be capable of operating down to zero degree F ambient air.
- G. The following safety devices shall be included on the condensing unit; high pressure sensor and switch, low pressure sensor, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
- H. To ensure the liquid refrigerant does not flash when supplying to the various indoor units, the circuit shall be provided with a sub-cooling feature.
- I. The condensing unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed milled steel panels coated with a baked enamel finish.
- J. Condenser fan shall be direct drive motors that have multiple speed operation via a DC (digitally commutating) inverter.
- K. CONDENSER COIL:
 - 1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.
 - 2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.
 - 3. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design.
 - 4. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film type E1.
 - 5. The pipe plates shall be treated with powdered polyester resin for corrosion prevention. The thickness of the coating must be between 2.0 to 3.0 microns.
- L. COMPRESSOR:
 - 1. The inverter scroll compressors shall be variable speed (PVM inverter) controlled which is capable of changing the speed to follow the variations in total cooling

and heating load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity (INV frequency or STD ON/OFF) shall be controlled to eliminate deviation from target value.

2. The inverter driven compressor in each condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll "G2-type" with a maximum speed of 7,980 rpm.
3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.
4. The capacity control range shall be as low as 4% to 100%.
5. Each non-inverter compressor shall also be of the hermetically sealed scroll type.
6. Each compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.
7. Oil separators shall be standard with the equipment together with an intelligent oil management system.
8. The compressor shall be spring mounted to avoid the transmission of vibration.
9. In the case of multiple condenser modules, conjoined operation hours of the compressors shall be balanced by means of the Duty Cycling Function ensuring sequential starting of each module at each start/stop cycle, completion of oil return, completion of defrost or every 8 hours.

2.4 BRANCH SELECTOR BOXES (HEAT RECOVERY SYSTEMS)

- A. ISOLATION VALVES - Full port, bi-directional flow isolation valves shall be installed upstream of all Branch Selector boxes. Where multi-port boxes are used, provide isolation valves both upstream and downstream of the box to facilitate isolation of individual fan coil units. Ensure Schrader fitting is positioned on the downstream side of the valve.
- B. Where heat pump systems are used, provide isolation valves at the fan coils.
- C. During simultaneous heating and cooling, the units in heating mode shall energize their subcooling electronic expansion valve.
- D. CONSTRUCTION:
 1. The Branch Selector boxes shall have a galvanized sheet plate casing.
 2. Each Branch Selector shall house 5 electronic expansion valves for refrigerant control. (Multi-port boxes shall maintain independent EEV construction. Sharing of valves between zones is not allowed)
 3. Where multiple boxes are installed on the same system, the piping shall be such that isolation of one box shall not disrupt refrigerant flow to other boxes. "Pass through" of refrigerant should not be used where isolation for service will prevent usage of other zones.
 4. The cabinet shall contain a subcooling heat exchanger.
 5. The unit shall have a sound absorption thermal insulation material made of flame and heat resistant foamed polyethylene.
 6. All pipe connections shall be brazed type.
 7. Branch Selectors shall not require condensate drains.
- E. ELECTRICAL:
 1. The unit electrical power shall be 208 Volt, 1 phase, 60 Hz.

2. The control voltage between the indoor and condensing unit shall be 16 Volt DC.

2.5 CONTROLS

- A. ZONE CONTROLLER – Each zone/FCU shall include a 7-Day Programmable controller with the following features:
 1. Backlit LCD display. Day of the week as well as time of day configurable for 12/24 hour clock shall be displayed. Display of temperature information shall be Fahrenheit. The controller shall be able to display and adjust room temperature in one degree increments.
 2. The controller shall have COOL, HEAT, FAN ONLY, DRY (dehumidification), and AUTO-CHANGE-OVER modes.
 3. For AUTO change over mode, the controller shall allow independent setpoints for heating and cooling to eliminate wide swings in temperature and unnecessary change over. Independent setpoint control shall be available at both local controller and the central controller
 4. Setback function shall be included with adjustable setback temperature override.
 5. The programmable controller shall have the capability of individually disabling the following buttons:
 - a. Menu/OK
 - b. ON/OFF
 - c. Mode
 - d. Fan Speed
 - e. Setpoint Adjustment (Up/Down Keys) (Set point adjustment shall be in 1 deg F increments)
 6. The controller shall allow for a local (controller-level) adjustable limitation of user setpoint range.
 7. SCHEDULING: (Schedules shall be controlled locally and/or via the BAS Interface - See control sequence.)
 8. The Remote Controller shall display error codes on the screen in the event of a system error.
 9. The following Fan Coil Unit sensor values shall be available at the wall mounted remote controller:
 - a. Controller thermister temp
 - b. (Refrigerant) Liquid line temperature
 - c. (Refrigerant) Gas line temperature
 10. 48 Hour battery back up of clock/date. All other settings shall be stored in non-volatile memory to ensure that settings are not lost upon power failure.
- B. CONTROL MODULE
 1. Manufacturer to provide control module to interface with other HVAC equipment and device, such as outside air pretreatment unit, exhaust fans, and emergency shut-down switch.
- C. CENTRAL CONTROLLER
 1. The building shall be installed with a web-enabled factory native central controller in tandem with the BACnet module to facilitate the remote monitoring and control interface to the City's maintenance office. The manufacturer native controller shall provide web users to manipulate the following functions:
 - a. On/Off Control
 - b. Schedule-Adjustment (schedules to be maintained locally and BAS)
 - c. Mode Selection – See control sequence for heat/cool changeover control
 - d. Setpoint Control (Independent heating and cooling setpoints available)
 - e. Operational Status and Alarm Notifications
 - f. Provide with battery backup and USB port for software updates
 - g. User and Administrator Levels with password protection.

h. Customize groups and zones

D. CONTROL SEQUENCE:

1. The VRF system shall be provided with required hardware and software to perform the core operational sequences detailed in this section. In addition to the manufacturer's control system, the VRF supplier will provide a BACnet gateway to provide the monitoring and control points to the Building Automation Contractor. The intent of this section is for a fully functional VRF system to be provided to the Owner and the BAS system shall monitor only.
2. The VRF manufacturer shall be responsible for all low voltage communication wiring between their components and central controller to facilitate these sequences. If the wiring is done by the installing mechanical contractor and/or the building automation contractor, the VRF manufacturer shall coordinate all wiring requirements.
3. The VRF central controller shall be provided onsite as a touch screen panel located in the administration office (or as directed by the Owner). It shall additionally be capable of being accessed to the internet via a Owner provided IP address and Ethernet connection. All functions detailed below shall be available via touch screen interface and internet access.
4. Display interface: The controller shall provide a floor plan layout of the building with the fan coil icons and temperature information visible on the screen. At commissioning, the fan coil units shall have the tagging updated to provide the applicable room numbers for the as-built installation. The visual interface shall provide clear indication of what fan coil units are connected to which particular condensing unit system.
5. The controller shall combine all indoor units onto a single central controller interface. The central controller shall provide these basic functions per zone:
 - a. Alarm Identification per fan coil unit (also available on the BAS system)
 - b. Min/Max set point limiting
 - 1) Heating set point and cooling set points shall be controlled individually
 - 2) Set points shall be adjustable at the zone level with adjustable limits controlled by the VRF central controller (initial programming shall limit cooling setpoint control to between 72 – 75 deg. Heating initial range to be 69 – 72 deg)
 - c. Occupied/Unoccupied set point control – Each classroom and the library shall be provided with a motion sensor compatible with the VRF system controls (Sensor provided by the VRF supplier). The motion sensor shall be used to facilitate an automatic set point adjustment when a room is unoccupied. During the regular operation hours (determined by the City's central control system) these zones shall control between the above set point limits. When the room is vacant for more than 5 minutes, as indicated by the motion sensor the fan coil unit(s) shall be turned off. The VRF controller shall automatically enable the fan coil unit(s) if the room temperature rises more than 2 degrees above the standard 75 deg cooling set point (adj) or 2 deg below the standard 72 deg heating set point (adj). The unit shall return to normal operation when motion is detected.
 - d. Timed override for after-hours air conditioning: During periods where the building is not in use (determined by the Owner's schedule and BAS system) the fan coil units shall be capable of being turned on at the wall mounted controller. The VRF system shall automatically turn off after 60 minutes (adj) of operation. This shall not require additional programming by the BAS central control system. Deer Park

Central Maintenance shall have the ability to override the after-hours operation to prevent operation (see applicable portion of the BAS system control sequence)

- e. When the system is off according to the Owner's schedule, the VRF controller shall cycle the cooling/heating if the temperatures exceed the unoccupied threshold temperatures. (85 cooling & 60 heating)
6. Heat/Cool Automatic Changeover Sequence:
- a. The VRF manufacturer's controller shall manage the heat/cool changeover automatically. The local thermostat MODE button shall be disabled by VRF central controller. (Central BAS has ability to manually override as needed, but regular management of heat/cool mode shall be performed by VRF Controller)
 - b. Requirement of manual change-over of heat/cool mode is not acceptable.
 - c. Each zone/fan coil unit shall have minor set point adjustment per the zone controller detail above. The central VRF controller shall monitor each fan coil unit connected to the heat pump condensing unit and compare the current temperature to the unit's set point. The central controller shall make the heat/cool mode changes for the group of fan coils based on the weighted average of their demand.
 - 1) Example – All zones are satisfied (system idle) and the system has heating mode enabled. Any fan coil on the system that has a space temperature rise above the active set point will result in a central enabling of the cooling mode.
 - 2) Individual fan coil units (or groups) should be capable of being assigned a higher priority if directed. This would allow heating/cooling needs of these units to drive the heat/cool mode changes.
7. Emergency shut-down switch shall deactivate outside air pretreatment unit and exhaust fans, but allow VRF systems to continue to operating. Manual reset will be required to allow outside air and exhaust systems to operate again.

PART 3 - METHODS

3.1 INSTALLATION

- A. Mechanical contractor must complete an accredited installation training class prior to starting the installation. The contractor's PM and piping foreman must each have certification.
- B. Installation shall be per manufacturer's recommendations. Extra care shall be provided to allow for expansion and contraction of piping. Contractor shall install expansion joints on gas lines per the manufacturer's recommendations.
- C. UNDER NO CIRCUMSTANCE SHALL THE FAN COIL UNITS BE OPERATED BEFORE STARTUP OR WITHOUT SPECIFIED FILTERS IN PLACE.

3.2 FIELD QUALITY CONTROL

- A. The installing contractor shall complete the installation and complete a total system pressure test of 550 psi for 24 hours prior to startup.

- B. THE MANUFACTURER OR MANUFACTURER'S AGENT SHALL BE RESPONSIBLE FOR ALL EVACUATION AND CHARGING OF REFRIGERANT FOR EACH SYSTEM AT STARTUP. CONTRACTOR STARTUP IS NOT ALLOWED.
- C. The manufacturer's agent shall provide the following startup services:
1. Evacuation of the piping system to a 400 micron vacuum (hold 3 hours)
 2. Proper charging of the system with R-410A **Refrigerant provided and installed by the installing contractor**
 3. Execution of all standard diagnostics.
 4. Connection to the system with the manufacturer's Service Checker software and creating an operational log of the following information for verification:
 - a. Each system operates with proper temperatures, delta T and superheat conditions in both cooling and heating modes.
 - b. Each fan coil unit is heating/cooling properly (verification that piping work has been installed properly).
 5. A digital copy of these operational logs shall be stored by the manufacturer's agent as well as delivered to the owner with warranty documentation.

END OF SECTION

SECTION 23 82 39 – UNIT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 SUBMITTALS

- A. Provide submittals as outlined in Section 23 00 00 General Mechanical

PART 2 - PRODUCTS

2.1 ELECTRIC UNIT HEATER

- A. GENERAL: Provide a U. L. Listed heater with formed steel casing with baked enamel paint finish, fan guard, ceiling mounting bracket, adjustable horizontal and vertical discharge louvers and direct drive propeller fan.
- B. CONTROLS: 24 volt controls transformer, staging contactors, fusing per NEC, thermal overloads, single point electrical connection, terminal panel, hinged door to control panel and wall thermostat. Provide two stages of control for units 25 kw and larger.
- C. HEATING ELEMENTS: High mass finned tubular heating elements.
- D. ACCEPTABLE MANUFACTURERS: Carrier, Chromalox, Markel, Modine and Trane.

PART 3 - EXECUTION

- 3.1 Installation shall comply with manufacturer's requirements and installation details on the Drawings.

END OF SECTION

SECTION 26 00 00 - GENERAL ELECTRICAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

Provide all supervision, labor, equipment and materials required for the installation of complete and operating electrical systems in the building. Pay all fees and obtain all permits related to construction activities and utility service installation.

1.03 GUARANTEE

All materials, apparatus and equipment furnished and installed under this Section of these Specifications shall be new and free from any defects when accepted by the Owner and shall be guaranteed in writing for a period of one year from the date of acceptance by the Owner. Provide extended equipment warranties as necessary to meet this requirement.

1.04 COORDINATION

- A. Coordinate work of this Division with that of other Divisions so that various components of the building will be installed at the proper time, will fit the available space and will allow proper service access to those items requiring maintenance. This means adequate access to all equipment, not just that installed in this Section.
- B. Where various items of equipment and materials are specified and scheduled, the purpose is to define the general type and quality level, not to set forth the exact trim required to fit the various types of ceiling, wall or floor finishes. Provide materials which will fit properly the types of finishes actually installed.
- C. It is contractor's responsibility to verify and coordinate with manufacturer for latest part numbers for all high voltage and low voltage system components and equipment during bidding period. Provide latest version of equipment.

1.05 DRAWINGS

- A. The drawings indicate approximate locations of the various items of electrical systems. These items are shown approximately to scale and attempt to show how these items should be integrated with building construction. Locate all the various items by on-the-job measurements, conformance with Contract Documents and cooperation with other trades.
- B. Prior to locating light fixtures, confer with Architect as to desired method of locating fixtures in the various areas. In no case should fixture locations be determined by scaling drawings.

- C. All light fixtures, speakers and other ceiling devices shall be located to conform to the ceiling grid system. Examine all drawings to become familiar with this requirement. Lighting fixtures in mechanical spaces are shown in their approximate location only. Do not install light fixtures until mechanical piping and ductwork is installed, then install lights in a location to provide best lighting.
- D. In certain instances, the Architect may require relocation of outlets, switches, etc. Where relocation is within five feet of location shown on drawings, and when Contractor is informed of necessary relocation before work is begun on this portion of the job, no extra compensation will be allowed.
- E. The drawings are schematic in nature and are not intended to show exact locations of conduit, but rather to indicate distribution, circuitry and control.

1.06 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. The drawings and specifications are intended to be complimentary. Any work exhibited in either of them, whether in the other or not, is to be executed according to the true intent and meaning thereof, the same as if set forth in all.
- B. Disagreement between the Drawings or specifications or within the Drawings or specifications shall be estimated using the better quality or greater quantity of material or installation, and a request for information shall be made to the Engineer.

1.07 ALTERNATES

Determine the scope of each specified alternate proposal by carefully reading all Divisions of the Documents. The Bid Form contains information explaining the extent of the construction to be performed under a specific alternate. Alternate proposals, which are not predominantly electrical in scope, are described in other Divisions of these Documents.

1.08 CODES

All materials and their installation shall be in accordance with the National Electrical Code, local building codes and the National Safety Code. Nothing in the plans and specifications shall be construed to permit work not conforming to the most stringent of the codes. Particular attention shall be paid to the U. L. codes for fireproofing of conduit, electrical devices and light fixtures that are part of or pass through fire rated ceilings, walls and floors.

1.09 VISITING THE SITE

The Contractor shall be familiar with the Drawings and Specifications and shall have examined the premises and understand the conditions under which he will be obligated to operate in performing the contract. No allowance shall be made consequently for any error through negligence in this regard.

1.10 ELECTRICAL SERVICE

- A. GENERAL: Obtain (during the bidding period) from the Power Company all required information to provide a complete electrical service installation as shown on the Drawings.

- B. FEES: Pay all fees and installation costs charged by the Power Company for temporary service. Power Company fees and charges for the permanent service will be paid by Owner. Kilowatt hour charges shall be paid by contractor until building is accepted by Owner.
- C. SERVICE: The service characteristics are 480Y/277V, 3 phase, 4 wire. The Power Company is CenterPoint Energy.
- D. NEW SERVICE ENTRANCE: Provide bus-type weatherhead, bus-type CT/meter, free standing service rack with galvanized steel support poles, cable tap box, j-boxes, disconnect switch, protective bollards or other special construction as required by the Power Company. Refer to Power Company standards. Contractor must contact power co. for electrical service standard during bidding period.
- E. EXISTING SERVICE ENTRANCE: For project has existing electrical service to remain, Contractor must ensure existing electrical service to remain active. The items 1.10 A., B, C and D are not applied for project with existing electrical service to remain. See electrical one-line diagram on plan for additional information. For project has existing electrical service to remove, disconnect and remove all existing electrical system and equipment for existing electrical service not to be reused.

1.11 TEMPORARY SERVICE

Provide a temporary electrical service for construction power. Size and voltage as required for construction activities as specified by the General Contractor. Construction site distribution shall be overhead and comply with NEC and OSHA Standards. Remove all temporary wiring upon project completion.

1.12 GENERAL REQUIREMENTS FOR ALL MATERIALS

- A. Provide all parts and accessories necessary for equipment and complete installation.
- B. Provide factory applied finish on all exterior surfaces of electrical equipment. Any item which has the finish marred must be refinished to a new condition before final acceptance.
- C. Provide three copies of spare parts lists and operating and maintenance instructions for all distribution apparatus, major equipment and auxiliary systems. These shall be bound in folders with suitable identification on front cover. Deliver to Architect prior to final acceptance.
- D. All materials must be new and of good quality and shall bear the stamp of approval of the Underwriters' Laboratories, Inc. (U. L.). Equipment and materials shall be used and installed consistent with the U. L. testing and U. L. requirements. All materials shall be certified to not contain any asbestos, PCB's or other material banned by the Environmental Protection Agency.
- E. All materials must meet UH requirements. See UH master construction specifications on UH web page. Disagreement between the specifications shall be estimated using the better quality or greater quantity of material or installation, and a request for information shall be made to the Engineer.

1.13 COORDINATION DRAWINGS

- A. The Mechanical Contractor shall take the lead in coordinating the Mechanical (HVAC), Electrical, Plumbing and Fire Protection Systems within the building.

- B. Contractor shall provide coordination drawing showing Mechanical (HVAC), Electrical, Plumbing and Fire Protection Systems within the building. Submitting the contract drawings as coordination drawings will not be acceptable.
- C. The coordination drawings shall include detailed and accurate representations of all equipment to be installed based upon the reviewed equipment submittals.
- D. The Mechanical Contractor shall hold a coordination meeting with all sub-contractors present to review the model and discuss coordination of the installation of the building systems.
- E. Upon completion of the coordination meeting, the Contractor shall submit the 3 1/4" scale drawings for review.
- F. The coordination drawings shall detail major elements, components and systems in relationship with other systems, installations and building components. Indicate locations where space is limited for installation and access, and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
 - 1. Indicate the proposed locations of pipe, duct, equipment and other materials. Include the following:
 - a. Wall and type locations
 - b. Clearances for installing and maintaining insulation.
 - c. Locations of light fixtures and sprinkler heads.
 - d. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
 - e. Equipment connections and support details.
 - f. Exterior wall and foundation penetrations.
 - g. Routing of storm and sanitary sewer piping.
 - h. Fire-rated wall and floor penetrations
 - i. Sizes and locations of required concrete pads and bases.
 - j. Valve stem movement.
 - k. Structural floor, wall and roof opening sizes and details.
 - 2. Indicate scheduling, sequencing, movement and positioning of large equipment in the building during construction.
 - 3. Prepare floor plans, elevations and details to indicated penetrations in floors, walls and ceilings and their relationship to other penetrations and installations.
 - 4. Prepare reflected ceiling plans to coordinate and integrate installations, air *distribution* devices, light fixtures, communication systems components and other ceiling *mounted* items.
- G. Sequence of Coordination

Below is hierarchy of model elements and the sequencing by which the models will be coordinated.

- 1. Structural and Architectural Model
- 2. Miscellaneous steel
- 3. Perform preliminary space allocation
- 4. Identify hard constraints (locations of access panels, lights, A/V space requirements, etc.)
- 5. Main and medium pressure ducts from the shaft out
- 6. Main graded plumbing lines and vents.
- 7. Sprinkler mains and branches
- 8. Cold and hot water mains and branches
- 9. Lighting fixtures and plumbing branches
- 10. Smaller sized ducts and flex ducts

11. Smaller size cold water and hot water piping, flex ducts, etc.
- H. The Contractor and Sub-Contractors shall not install any item until the coordination *has been* completed and reviewed by the Construction Manager, Owner and A/E Team.
- I. This Contractor shall be responsible for coordination of all items that will affect the installation of the work of this Division. This coordination shall include but not be limited to: ampacity, capacity, electrical and piping connections, space requirements, system construction, building requirements and special conditions.
- J. By submitting shop drawings on the project, this Contractor is indicating that all *necessary* coordination has been completed and that the systems, products and equipment *submitted can* be installed in the building and will operate as specified and intended, in full coordination with all other Contractors and Subcontractors.

1.14 SUBMITTALS

- A. The purpose of these submittals is to attempt to aid the contractor in such a manner that improper or unacceptable materials are not delivered to or installed on the job. Approval of these submittals shall not be construed as releasing The Contractor from compliance with the Contract Documents. All materials and equipment shall be subject to final acceptance by the Engineer at completion of construction.
- B. Equipment and material submittals must show sufficient data to indicate complete compliance with contract documents as follows:
 1. Proper sizes and capacities.
 2. That the item will fit in the available space in a manner that will allow proper service.
 3. Construction methods, materials and finishes.
- C. Catalog data must be clearly marked to indicate the item or model number being submitted and must include all specified accessories. All information on a catalog sheet not pertaining to the item being submitted must be marked out.
- D. All submittals must be bound in book form with a table of contents listing all items in that specific submittal. Loose catalog sheets or drawings will not be acceptable. All submittals on the project need not be submitted in one book. The front sheet of each copy of the submittal shall have the following typed information:
 1. Job name and location.
 2. General Contractor's name, address, Project Manager's name and telephone number.
 3. Submitting Sub-contractor's name, address, Project Manager's name and telephone number.
 4. Supplier's company name, address, salesman's name and telephone number.
 5. Signature of an officer or attorney-in-fact of the Sub-contractor with date and title and a statement that the submittal materials and equipment complies with the contract Documents.Any submittal without all of the above information will be rejected without review.
- E. For any item to be installed in or on a finished surface (such as tee bar acoustical ceiling, plaster wall), Contractor certifies by making the submittal that he has checked all applicable contract Documents and that the item submitted is compatible with the surface finish on which it is to be installed.
- F. Submit shop drawings and/or brochures for:

Switchgear
Lighting Control Devices

Wiring Devices
Fire Alarm System

Light Fixtures
Generator and ATS

- G. If a submittal is returned to the Contractor marked "Rejected" or "Revise and Resubmit", only one (1) additional submittal will be permitted without the Contractor incurring charges for the additional re-submittals. Lee Truong & Yu Engineers (LTY) shall be reimbursed by the Contractor for any expense in connection with any necessary submission in addition to the two (2) submissions allowed. Contractor will be billed by LTY at a rate of \$125/hr for these occurrences.

1.15 SUBSTITUTIONS

- A. The names of manufacturer and model numbers have been used in the Contract Documents to establish types of equipment and standards of quality and are intended to be the Basis of Bid. If only one manufacturer is named for a specific item of equipment alternate manufacturers shall be acceptable as a substitution/approved equal as specified in this Article.
- B. All other brands, including any additional names which may be listed as "Alternates" or "Approved Equal" must conform with the specifications, size, accessories, etc. of the first named brand and be subject to Paragraph D and E of this Article. Alternate equipment must be equal from the standpoint of materials, construction and performance. Request for substitution must be accompanied by complete data and descriptive sheets during the bidding period as described in Paragraph D and E of this Article.
1. Submitted on Bidder's letterhead attached to Proposal Form with individual deductive amounts stipulated and the documentation required in Paragraph E-03.
 2. All savings for Owners selection of deductive amounts by acceptance of alternate or substituted items are to be paid to the Owner.
- C. All equipment within common group or category (e.g. switchgear, lighting fixtures, fire alarm, etc.) shall be same manufacturer.
- D. Proposed Substitutions/Approved Equals:
1. Submitted no less than 7 calendar days prior to bid date.
 2. Submit proposed substitutions with catalog data and/or manufacturer's shop details indicating all modifications required to conform with specified brand. Include all relevant items necessary to make a determination of equal status or submittal shall be deemed incomplete and rejected.
 3. If submittal contains sufficient information to prove compliance with the Contract Documents, then that alternate submittal will be acceptable. Approved submittals for bidding purposes only will be published by addenda.
- E. Substitutions with prior approval:
1. Submitted on Bidder's letterhead attached to Proposal Form with individual additive/deductive amounts stipulated and the documentation required in Paragraph B-2.
 2. Owner reserves the right to accept or reject any or all substitution proposals before execution of Contract.
 3. Provide all design/engineering services required to make adjustments in space, systems, utilities, etc. and pay all additional costs of utilities, construction or professional services that may be incurred due to the acceptance of any substitution.

1.16 PROTECTION OF EQUIPMENT

- A. Do not deliver equipment to jobsite until progress of construction has reached the stage where equipment is actually needed, or until building is closed in enough to protect equipment from the weather. Equipment allowed to stand in weather will be rejected, and Contractor is obligated to furnish new equipment at no cost to Owner.
- B. Adequately protect equipment (including all Owner-furnished items) from damage after delivery to job. Cover with heavy cloth as required to protect from damage.
- C. Equipment which has been damaged by construction activities will be rejected. Contractor shall furnish new equipment at no cost to Owner.

1.17 FOUNDATIONS AND EQUIPMENT SUPPORTS

- A. GENERAL: Provide all foundations and supports.
- B. CONCRETE HOUSEKEEPING PADS: Concrete pad to be provided under Division 3, for all floor mounted equipment. 5-1/2" high concrete in central plant, main normal and emergency electrical rooms, fire pump room. 4" high concrete for other electrical rooms. Concrete pads shall be sized for the equipment to be supplied. Pad shall exceed base dimensions by approximately 4" all around. Reinforce pads with 6" x 6" woven wire mesh and #4 bar around perimeter. Tool pad to form chamfered edge. Furnish galvanized anchor bolts with layout templates for installation in equipment pads. Bolts shall be of the size and quantity recommended by the manufacturer and where vibration isolators are used, they shall be anchor bolted to the equipment pad.
Note: Concrete pad for outdoor power company pad mounted transformer shall be constructed per power company standard. Also, Concrete pad for emergency generator and outdoor switchgear shall have the same requirement as the power company pad mounted transformer. Re: Power co. standard for outdoor conc. pad height.
- C. OUTDOOR ELECTRICAL EQUIPMENT: Provide structural pad to support pad mounted transformers and outdoor switchgear. Provide galvanized pipe or angle iron structure to support weatherheads, meters, and outdoor protective devices and disconnect switches.
- D. INSIDE ELECTRICAL EQUIPMENT: Securely attach panels to block walls with concrete bolts. When attaching to sheetrock or other less substantial walls, provide blocking and unistrut cross supports to securely attach panel to structural members. Where panels are required to be freestanding provide angle iron support structure bolted to floor and building structure.
- D. VIBRATION ISOLATION: Install dry type transformers on four waffle pad type isolators.

1.18 NOISE

Eliminate any abnormal noises which are not considered by the Architect to be an inherent part of the systems as designed. Abnormal buzzing in equipment components will not be acceptable.

1.19 RECORD DRAWINGS

- A. Obtain a set of project drawings and keep these at jobsite during construction. During the course of construction, mark on these prints any changes which are made, noting particularly locations for those items which will need to be located for servicing. At completion of job, mark each sheet "Record Drawings", date, signature, and deliver to Architect.

- B. Approval: Prior to final acceptance of the Work of this Division, the Contractor shall submit three prints of properly certified Record Drawings to the Engineer for review and shall make changes, corrections or additions as the Engineer may require to the Record Drawings. Two final sets furnished to Owner.

1.20 MOUNTING HEIGHTS

- A. GENERAL: Heights are measured to centerline from the finished floor. Where devices are located in block walls Architect may require height to be adjusted so junction box is in a desired relationship with the mortar joint. Device must still be mounted within the acceptable height range for ADA.
- B. DEVICE:

Light switch	46"
Receptacle	18"
Receptacle at counter	7" above countertop
Data outlet	18"
Telephone outlet	18"
Telephone outlet at counter	7" above countertop
Wall telephone	46"
Desk telephone	18"
Clock outlet	12" below ceiling or 96" maximum
Wall exit light	Bottom 4" above door frame or 96"
Fire alarm pull station	46"
Fire alarm horn or flasher	on ceiling if possible otherwise at 82"
Wall TV outlet	18"
Outdoor bells or speakers	as shown on the Architectural Drawings
Wall Pack Lights	as shown on the Architectural Drawings

Note: See Technology consultant's Drawings for additional mounting height requirement for technology devices.

1.21 ELECTRICAL INSPECTIONS

- A. Contractor shall formally request inspections from Lee Truong & Yu Engineers (LTY) to review any and all electrical installations. Inspections shall include but not be limited to: system tests, grounding tests, underground installations prior to backfill, rough-in installations, wall cover inspections, above ceiling inspections, final inspection.
- B. Information required from Contractor on each and every request for inspection is as follows:
 1. Specific type of inspection (i.e. underground conduit installation, wall cover up, fire alarm demonstration, etc.).
 2. Exact location of test (i.e. area of building with wing or room numbers).
 3. Description of test (i.e. partial inspection, walls only, chase walls, wall cover, ceiling cover, etc.)
 4. Exact time of any tests that are to be observed. Estimated time test will start will not be acceptable.

5. Verification from General Contractor with name of person that verified, that specific test has been verified by the Contractor and all sub-contractors to meet all requirements of the Specifications and Codes (prior to inspection request).
- C. Contractor shall provide a MINIMUM of 48 hour notice prior to requested inspection time, no exceptions.
 - D. INSPECTION REPORTS: After each inspection, LTY will generate an inspection report and distribute promptly. The Contractor will then be given 7 working days from date of report to address all deficiencies listed on the report. The GENERAL CONTRACTOR shall verify that all items on each inspection report have been addressed by their subcontractors in this time period. Once verified the GENERAL CONTRACTOR shall sign-off on each deficiency listed on the report and return the signed-off copy of the inspection report to LTY via e-mail. After the signed-off report is returned to LTY, the GENERAL CONTRACTOR shall request a re-inspection by LTY to close the report. If after 7 working days no re-inspection is requested by the GENERAL CONTRACTOR to close a report, LTY reserves the right to re-inspect whenever our schedule allows, with these re-inspections still being subject to Paragraph E below.
 - E. TEST REJECTIONS AND RE-INSPECTIONS: If a test is rejected or a re-inspection of an issued LTY Inspection Report is found to NOT be completely addressed, only ONE (1) additional inspection will be permitted without the Contractor incurring charges for each additional inspection required. LTY shall be reimbursed \$500 by the GENERAL CONTRACTOR for expenses in connection with EACH inspection in addition to the two (2) inspections allowed.
 - F. GOVERNMENTAL INSPECTIONS: Contractor shall test and demonstrate systems, allow for LTY and Owner inspections, and correct all punch list items before arranging for inspections from the Fire Marshall or other final "Certificate of Occupancy" inspection requirements. This will require that the contractor complete systems in a timely manner to meet construction schedules.

1.22 TESTING BY CONTRACTOR

A. GENERAL:

1. All wiring, instruments, apparatus and equipment shall be tested for continuity, ground and short circuits before the circuits are energized. For 120 Volts circuits, the neutral/s may require disconnecting. A complete record of all testing shall be submitted to Owner at completion.
2. Tests shall be made during the course of construction as specified and as required by authorities having jurisdiction. Such tests shall be conducted by this Division as a part of the Work and shall include all personnel, material, and equipment required to perform tests until satisfactory results are obtained. Any defects detected during testing shall be satisfactorily repaired or the equipment involved shall be replaced and the tests re-executed.
3. Any resultant delay as a result of such necessary retest, does not relieve the Contractor of his responsibility under this contract.
4. Notify the Engineer and the Owner's Representative in writing two weeks prior all scheduled testing to allow time for scheduling witness of testing, where elected by the Engineer and Owner's Representative.

- B. **GROUND TESTING:** The resistance of the grounding system to ground shall not exceed 3 ohms for water pipe ground or 6 ohms for driven ground rods. If tests indicate a higher value, additional ground rods shall be installed to reduce the resistance to a value of 6 ohms or less. Whenever connection is required to an existing ground conductor, tests shall be made before connection to insure that the existing ground conductor is unbroken and continuous. Ground tests shall be performed after at least 7 days of dry weather with test meter supplying a minimum of 50 amps to the ground rod. Auxiliary current electrode shall be approximately 85 feet from ground rod and auxiliary potential electrode shall be 62% of this distance from the ground rod in between the two rods.
- C. **INSULATION TESTING:** Test all electrical equipment bussing, underground feeders and feeders 1/0 and larger at 85% of rated insulation value. Insulation tests shall be made with a 500 volt "Megger" as manufactured by James G. Biddle Company or equal. Test one conductor at a time with other two grounded. Attempt to raise voltage to maximum in one minute. Do not exceed 2 MA. Polarization Index (amps ratio - 1 minute/10 minutes) to be at least 3 unless approved otherwise.
- D. **Thermographic Testing:** Conduct a thermographic test of the main switchboards, distribution panels, panelboards, automatic transfer switches, busway joints, motor control centers, transformers, disconnect switches, contactors, relay panels, dimming system controller and other electrical distribution apparatus and connections using an infrared temperature scanning unit. The test shall be performed by an independent testing laboratory (General Electric, Eaton Electrical Systems and Solutions or Siemens Industrial Service). Connections that are not indicating higher temperature levels acceptable shall be tightened, lugs replaced and/or OCPD replaced as required to eliminate the condition. Conduct test, using test reporting forms, between 6 and 8 months after beneficial occupancy, but in no case beyond the one year warranty period. Correct unacceptable conditions prior to end of the warranty period.
- E. **Conductors and Cable Testing:** Refer Electrical Wiring Specification Section.
- F. **Lighting Control Device and Equipment Testing**
- G. **Football Lighting and Dimmable Light Control System Testing**
- H. **Emergency Generator Set and Emergency Lighting and Fire Pump Testing**
- I. **Electrical Switchboards/Panelboards, XFMR and other electrical switchgear Testing:** Refer Electrical Switchgear Specification Section.
- J. **Fire Alarm System Testing**
- K. **ADDITIONAL TESTING:** The Contractor shall make such other tests as may be or become necessary to assure satisfactory operation of each unit device or equipment.
- L. **Testing Submittals:**
 - 1. **Personnel:** Submit evidence to show that the personnel who will actually test the systems are qualified and state certified.
 - 2. **Testing Procedures:** Submit four copies of all proposed testing procedures to the Engineer for review at least 30 days prior to conducting any testing.
 - 3. **Reporting Forms:** Submit four copies of proposed forms to be used in recording testing data and results to the Engineer for review at least 30 days prior to conducting any testing on the project.
 - 4. **Test Data and Results:** Submit four copies of complete data and certified test results for each test performed, including, but not limited to:

5. Operational Certification: Submit four certified copies of an operational certification which documents that all equipment and systems have been fully tested to verify proper operation in accordance with the design shown in the Construction Documents and manufacturer's recommendations.
6. Certification: Certifications stating that submitted test data and results are true and correct shall be provided for all submittals under this Section. Certification shall be executed by an authorized officer if the Contractor is a corporation, by a partner if the Contractor is a partnership, by the Owner if the Contractor is a sole proprietorship or by the authorized representative if the Contractor is a joint venture.
7. Calibration List: Submit four copies of a listing of testing devices to be used for the project to the Engineer for approval. Listing shall include documentation that devices are properly and currently calibrated.
8. Test Log: The Contractor shall maintain a test log at the site to document the results of all successful and unsuccessful testing and balancing as it is performed. This log shall be available for review by the Engineer and a copy of the log shall be submitted to the Engineer and Owner's Representative prior to the Substantial Completion inspection. A space shall be provided on the test log for signoff by the Owner's Representative.

1.23 CERTIFICATIONS AND TEST REPORTS

- A. The Engineer may, at their option, witness any or all on and off-site acceptance and operational testing. Submit a detailed listing of certification and testing for each system indicating estimated dates for completion of system installation. This listing of certification and testing shall be submitted at least 30 days before any testing is conducted.
 1. Test procedures and test result reporting forms shall be submitted for review no later than the date of the certification and testing listing submittal.
 2. Notify the Engineer in writing two weeks prior to all scheduled testing to allow time for Engineer to schedule witnessing of testing, where elected by the Engineer.
 3. Submit four copies of all certifications and test reports to the Engineer for review adequately in advance of completion of the Work to allow for remedial action as required to correct deficiencies discovered in equipment and systems.
 4. Certifications and test reports to be submitted shall include, but not be limited to those items outlined in the testing requirements for all Specification Sections of this project manual.

1.24 OPERATING AND MAINTENANCE MANUALS:

- A. Submit two copies of Operating and Maintenance Manuals to the Engineer for approval prior to the beginning of operator training. Provide four approved Operating and Maintenance Manuals for use in operator training. Manuals shall be bound in rigid cover, 3-ring binders with spine and cover labels and shall provide operating and maintenance information for every piece of equipment furnished under this Specification. All sections shall be typed and indexed into sections and labeled for easy reference. Bulletins containing information about equipment which is not installed on the project shall be properly marked up or stripped and reassembled. All pertinent information required by the Owner for proper operation and maintenance of applicable equipment supplied by Division 26, 27 and 28 shall be clearly and legibly set forth in memoranda which shall, likewise, be bound with bulletins. As a minimum, the following information shall be provided as applicable:
 1. Complete description of each system, item of equipment, and apparatus provided under this Division, including ratings, capacities, performances, data and curves, characteristics identifying name and number, locations, and wiring diagrams, including sources for all parts.
 2. Fully detailed parts lists, including all numbered parts and recommended spare parts, of each item of equipment and apparatus provided under this Division.

3. Manufacturer's printed instructions describing operation, service, maintenance, and repair of each item of equipment and apparatus.
4. Typed record of tests made of materials, equipment, and systems included under this Division. Such records shall state the dates the tests were conducted, name(s) of person(s) making and witnessing the tests, and citing any unusual conditions relevant to the tests.
5. Identifying names, name tags designations and locations for all equipment.
6. Fuse and motor heater information including location and use.
7. Equipment and motor nameplate data.
8. Copies of all approved Shop Drawing submittals.
9. Fabrication drawings.
10. Equipment and device bulletins and cutsheets clearly highlighted to show equipment installed on the project and including performance curves and data as applicable.
11. Maintenance instructions clearly highlighted to show all required periodic maintenance and lubrication.
12. Wiring diagrams.
13. Operating instructions clearly highlighted to show proper operating procedures for all equipment.
14. Exploded parts views and parts lists for all equipment and devices.
15. Color coding charts for all painted equipment and conduit.
16. Location and listing of all spare parts and special keys and tools furnished to the Owner.

1.25 TOOLS

Provide and deliver to the Owner's authorized representative any special tools required for maintenance of systems, equipment, and apparatus installed under this Division prior to requesting final acceptance of the installation.

1.26 OWNER'S INSTRUCTIONS

- A. Contractor shall have appropriate factory-trained representatives to provide the following periods of on-site instructions to Owner's designated personnel upon completion of the systems' installation:

Electrical Systems:	4 Hours
Lighting Control Systems:	4 Hours
Fire Alarm System:	4 Hours

- B. Outline: Prior to instruction of Owner Personnel, prepare a typed outline, listing the subjects that will be included in this instruction, and submit the outline for review by the Engineer.
- C. Recording: Contractor shall record all the instructions in MP4 format video. Submit rvideo in USB Drivers to Owner. Provide separate USB driver for each different system.
- D. Certification: At the conclusion of the instruction period obtain the signature of each person being instructed on each copy of the approved outline to signify that he has a proper understanding of the operation and maintenance of the systems and resubmit the signed outlines.
- E. Other Requirements: Refer to other Division 26, 27 and 28 Sections for additional Operator Training requirements.

1.27 CONTRACTOR WARRANTIES AND GUARANTEES:

- A. General: Contractor shall guarantee all material and equipment installed by him against defects in workmanship and material for a period of 24 months after final acceptance of the work by the Owner and he shall repair or replace any materials or equipment developing such defects within that time, promptly on due notice given him by the Owner and at Contractor's sole cost and expense.
- B. Equipment: All equipment bearing a manufacturer's guarantee, such as electrical equipment, devices, components, and similar items, shall be construed to have an extended guarantee to the Owner by the manufacturer. Any such equipment that proves defective in materials or workmanship within the guarantee period is to be replaced by the Contractor in accordance with the manufacturer's guarantee.
- C. Start-up: The Electrical Contractor shall provide instructions and equipment starting service on new equipment for two complete years after date of final acceptance of the work by the Owner, at Contractor's sole cost and expense.

END OF SECTION

SECTION 26 05 00 – ELECTRICAL WIRING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL INSTALLATION REQUIREMENTS

- A. All electrical work dealing with electrical circuits or power requirements of 50 volts or higher shall be performed by a licensed journeyman electrician supervised by an on-site master electrician.
- B. All cables not installed in conduit shall be plenum rated.
- C. All conductors and cable shall be properly labeled at both ends and at any intermediate splice.
- D. All low voltage cables shall be installed in continuous length without splice.
- E. All plenum rated cables above accessible ceilings shall be supported from and near structure with nylon straps or D-rings. Do not weave through joists for support. All exposed cabling, and cabling above inaccessible ceilings shall be installed in raceway.
- F. Install conduit sleeves for all masonry penetrations of plenum rated cables.
- G. In areas of remodeling, remove all conduit and wire that is not to be reused.
- H. Provide grounding bushings for all connections at concentric and eccentric knockouts, and where reducing washers are used.
- I. All junction boxes and other devices above ceiling that may require maintenance shall be located within 18" of the ceiling.
- J. All exterior junction boxes in the ground shall be concrete type with traffic rated tops.
- K. Junction box covers shall be labeled with circuit numbers and relay numbers of wiring within the box. Circuit labels shall be readable from the floor level without removing the cover. Junction boxes, and covers shall be color coded by voltage. Color code as follows: 120/208V – Green, 240V – Blue, 277/480V – Orange, HVAC Controls – Yellow, Fire Alarm and Emergency Circuits – Red
- L. General Contractor shall coordinate with Electrical Contractor and Low Voltage Subcontractors that all conduits, cable trays, J-boxes, sleeves and 120V circuit under all sections in [Divisions 26, 27 & 28](#) shall be provided and installed by Electrical Contractor under the base proposal pricing – No exception. All low voltage cable must be installed in conduit except the plenum rated low voltage above the accessible lay-in ceiling may be supported by cable trays 18" above the ceiling without conduit.

PART 2 - MATERIALS AND METHODS

2.1 RACEWAY SYSTEMS

- A. **REQUIRED:** Complete raceway systems for all wiring. This includes, but is not limited to feeders, branch circuit wiring, temperature controls wiring, data cabling, telephone, audio and video cabling, intercom system, local sound system, clock system, security/CCTV/access control systems and fire alarm system wiring. Generally auxiliary system and controls wiring is plenum rated so conduit system would consist of junction boxes and conduit in walls or above inaccessible ceilings only. Control and interlock wiring shall be provided under the Mechanical Section. Note that the access control system requires conduit from door frame card readers to a junction box above an accessible ceiling that is no more than 10 feet high.
- B. **RACEWAY CAPACITY:** It shall be the Contractor's responsibility to determine the correct sizes of all types of raceway, to be installed, as instructed in the NEC and all applicable Codes. Runs of underground conduit longer than 80 feet shall be one size larger than NEC requirement, 4" maximum.
- C. **INSTALLATION:**
1. **LOCATION:** Conceal all raceway systems in ceilings, walls and floors, except feeders serving equipment in mechanical and electrical equipment rooms, and in such other areas as indicated where conduit may be exposed. Keep at least 8" away from any heat producing items. Do not install normal conduit and feeders below grade or in floor slabs unless there is no other way to conceal conduit except emergency feeder for emergency generators, automatic transfer switches, emergency switchgear and fire pumps shall be installed underground with red concrete encased. Chiller feeders in mechanical yards may be run above grade with chiller piping support rack if chiller piping are above grade. Outdoor Pad Mounted Switchgear feeders shall be run below grade with red concrete encased. Do not install conduit on roof unless specifically shown to be on the roof or authorized in writing by the Engineer. All junction and pull boxes above accessible ceilings shall be mounted so that the access panel is no higher than 18" above the ceiling.
 2. **ROUTING:** Conduit shall be installed parallel to building coordinates, except for underground feeders from panel to panel may be installed in the most direct manner. Install all horizontal conduit at structure unless mounted to a wall.
 3. **EXPOSED RACEWAY:** Run parallel to walls, ceiling or structural members, in a manner to present a neat appearance. Before installation, explain to the Inspector the proposed method of routing and obtain his approval. Hold all horizontal conduit at ceiling or structure, unless mounted on wall. No outdoor exposed conduit unless authorized in writing by the Engineer. No outdoor conduit shall be penetrated on top of the outdoor switchgear, starter or disconnect switch. – No exception.
 4. **SUPPORT:** Provide adequate and sturdy support for all parts of raceway system. Conduit concealed in walls or slabs may be supported with wire hangers, provided they are of heavy gage and spaced to give adequate strength. Exposed conduit must be supported with materials specifically made for this purpose; do not use wire hangers. Do not attach any parts of raceway system to air conditioning ducts or ceiling systems. Wiring above ceiling without conduit shall be supported from structure with J hooks. Unless described by detail on the drawings, provide Tolco Pipe Pier Supports four feet on center to support conduit on the roof. Select for proper weight loading. All panelboards shall be mounted on 1-5/8 x 1-5/8 unistrut, and not directly install to a sheetrock surface. All supports shall be NEC approved.

5. CONTINUITY: Make all joints and connections in a manner which will insure mechanical strength and electrical continuity. Use double locknuts and insulated bushings for rigid conduit, and insulated type connectors for EMT conduit 1" and larger for connections to boxes. Use insulated grounding bushings wherever connection is subject to vibration or moisture, such as near mechanical equipment, when internal ground wire is installed, and when concentric or eccentric knockouts are encountered, as well as where reducing washers are used.
 6. PULL BOXES: As required by the National Electrical Code.
 7. EXPANSION FITTINGS: Install O. Z. or equal expansion fitting in each run of conduit which crosses building expansion joint, and in all runs longer than 200 feet.
 8. CORROSION PROTECTION: For all non-coated metal raceway in contact with concrete or mortar, tape with 3M corrosion protective tape, or equal. Tape shall extend for approximately 6" before entering and after exiting concrete.
 9. PULL WIRE: Install nylon pull cord in all empty electrical power raceway systems.
 10. OPENINGS: Keep all raceway openings closed in a manner to prevent entry of moisture and foreign materials until conductors are installed.
 11. FIRE PROOFING: All power and telephone raceway components passing through or installed within U. L. fire rated walls, ceiling or floor structures shall be fireproofed in the manner prescribed by the U. L. Fire Resistive Index and local building codes. All penetrations shall be fireproofed with 3M Fire Barrier CP25WB caulk, moldable putty or FS-195 wrap/strip installed per the manufacturer's recommendations.
 12. MARKING: All junction and pull boxes shall be marked noting electrical circuits contained. Junction boxes, and covers shall be color coded by voltage. Color code as follows: 120/208V – Green, 240V – Blue, 277/480V – Orange, HVAC Controls – Yellow, Fire Alarm and Emergency Circuits – Red. Paint colors shall be light enough to ensure that the circuit numbers can be easily distinguished. On inside of all device wall plates and inside of junction boxes, indicate panel and circuit number feeding the device.
 13. SEALING: All conduit, junction box, outlet box and other penetrations of the building envelop, exterior and interior ceiling, floors and walls shall be sealed with non-hardening caulking or other non-hardening material.
 14. Access Doors: This Contractor shall provide wall or ceiling access doors for installation in finished surfaces for unrestricted access to all concealed items of electrical equipment.
 15. Tamper Resistant Fasteners: All exposed fasteners utilized shall be of a tamper resistant design. All fasteners shall be of the same type whenever possible.
- D. MANUFACTURERS: All components of raceway systems must be made in U.S.A. and bear U. L. label.

2.2 CONDUIT

A. CONDUIT TYPES

1. RIGID GALVANIZED STEEL – Threaded fittings. Hot Dipped galvanized steel. Expansion fittings shall be OZ type "DX" Appleton type "XJ", Crouse-Hinds type "XC" or an approved equal & shall have bonding jumpers. Cut ends shall be recoated with cold galvanized paint.

2. PVC COATED RIGID GALVANIZED STEEL - Plasti-Bond REDH₂OT with ETL Verified PVC-001 label or equal Perma-Cote or KorKap with ETL Verified PVC-001 label. Provide Plasti-Bond coated couplings, fittings and pulling elbows from the same manufacturer. Installation of the PVC Coated Conduit System shall be performed in accordance with the Manufacturer's Installation Manual. To assure correct installation, the installer shall be certified by Manufacturer to install coated conduit.
3. PVC CONDUIT – [Schedule 80](#) (Schedule 80 for Power Co. service conduit)
4. EMT – Steel conduit with steel set screw fittings. Provide insulated throat watertight fittings where conduit is exposed to dampness inside building. All EMT connectors shall have insulated throats or bushings.
5. FLEXIBLE METAL CONDUIT – Greenfield, galvanized steel conduit for field installation of conductors (maximum 24" long).
6. LIQUID TIGHT FLEXIBLE METAL CONDUIT – SealTite Type UA galvanized steel conduit with PVC waterproof coating for field installation of conductors (maximum 24" long except light fixtures up to 72"), Neoprene gaskets and O-rings, insulated throat.
7. MC CABLE – Flexible steel conduit with factory installed, stranded copper conductors and green insulated ground wire. Steel interlocked armor with colorTrak ID system, full size aluminum bonding/grounding conductor and additional Green Grounding wire. Acceptable Manufacturer AFC or Equal. Note: Type MC shall not be used for wiring any emergency system. Maximum 6 FT long. Allow for light fixture whips from J-box and rigid conduit system. Do not loop light fixtures with MC cable.
8. SURFACE RACEWAY – Wiremold steel raceway, ivory finished and mechanically connected to walls or casework. Type based on application. (only allowed where specifically noted on the drawings). Wiremold must be paintable. Coordinate with General Contractor to paint wiremold with the same wall color.
9. ELECTRICAL GUTTERS AND WIREWAYS - Provide galvanized steel electrical gutters and wireways, sizes per NEC, minimum 16 gauge thickness, with rounded edges and smooth surfaces; constructed in compliance with applicable standards; and with additional features as indicated or required. Provide hinged or removable cover on raceway where noted on drawings. All power wiring raceways shall have a cover. No stamped knock out's. Provide all sheet metal parts with rust inhibiting phosphatizing primer coating and finished in gray enamel. All hardware shall be cadmium plated to prevent corrosion.
10. CABLE TRAYS – Cooper B-Line 36 Series aluminum, ladder type cable tray with 9" rung spacing. Width based on application. Support per manufacturer's recommendations. Usable depth shall be minimum 4".

B. TYPE OF CONDUIT FOR VARIOUS LOCATIONS:

1. UNDERGROUND: Rigid galvanized steel or [Schedule 80](#) PVC (Schedule 80 PVC also for Power Co. conduit). Conduit in contact with concrete shall be PVC coated, rigid galvanized steel. Install PVC coated, rigid galvanized steel, long radius elbows where conduit turns up to grade. Elbow shall extend a minimum of 2" above the grade or concrete slab. Encase all normal and emergency underground conduit under building slab or outside building slab in a 3" red concrete envelope located a minimum of 48" below grade. Install red tracer tape on top of red concrete. Notify Inspector for inspection of duct bank at least 24 hours prior to concrete placement. Do not install conduit below grade or in floor slabs unless there is no other way to conceal conduit [and authorized in writing by the Engineer & Owner](#). Conduit below building

slab or conduit for telephone, data, etc. also require concrete encasement.

Note: Do not install underground conduits unless approved by Owner in writing. Conduits must installed under building slab containing branch circuits for such as island casework or floor mounted electrical and low voltage communications, etc. shall be a minimum of 24 inches below top of slab and on select fill. All other conduits including main feeders for electrical voice / data video / communications, transformer primary and secondary, and panel feeds shall be minimum 48 inches below top of slab with red concrete encased and on select fill.

2. IN POURED CONCRETE WALLS: PVC coated, rigid galvanized steel or Schedule 80 PVC. Install PVC coated rigid steel fittings on PVC conduit prior to conduit exiting concrete.
 3. IN MASONRY WALLS: Galvanized steel EMT with steel, watertight fittings.
 4. EXPOSED OUTSIDE OF BUILDING: Rigid galvanized steel. For conduit in mechanical courtyard within 50 feet of a cooling tower provide PVC coated, rigid galvanized steel conduit and fittings.
 5. INSIDE OF BUILDING IN CEILING CAVITIES, IN EXPOSED FLOOR OR ROOF STRUCTURE AREAS, OR IN DRY WALL TYPE CONSTRUCTION: Galvanized steel EMT or rigid galvanized steel.
 6. EXPOSED ON EXISTING MASONRY OR PLASTER WALLS IN FINISHED AREAS: Wiremold V500 metallic raceway, ivory finish, complete with various boxes, devices, offsets and transitions. For data systems provide Wiremold 2000 Series or larger consistent with cabling requirements, ivory finish, metal raceway with various devices, offsets and transitions. Provide Wiremold 4000 two compartment if both data and power wiring are installed together. All raceway shall be mechanically fastened to walls or cabinets. No tapes or glues allowed. Wiremold must be paintable. Coordinate with General Contractor to paint wiremold with the same wall color.
 7. IN CONCRETE SLABS: Do not install conduit in concrete slabs.
 8. FLEXIBLE METAL CONDUIT CONNECTIONS: Use only for connection to motors and transformers from rigid conduit system. Do not loop flexible conduit between light fixtures or receptacles. Provide liquid tight construction and fittings in wet, damp or outside areas. Connections to mechanical equipment in main mechanical or boiler room, and kitchen equipment shall be in liquid tight. Do not install inside an air handling unit room. Minimum length shall be 18". Maximum length shall be two feet except light fixture whips may be up to six feet.
 9. LIGHT FIXTURE WHIPS: MC cable. Maximum 6 FT long from J-box and rigid conduit system. Do not loop light fixtures with MC cable.
Note: Type MC shall not be used for wiring any emergency system.
- C. MINIMUM CONDUIT SIZE: 3/4" for power, 1"C for data, 1.25"C for A/V. Maximum 40% cross section area of each conduit shall be filled with cable. No exception.
- D. FITTINGS:
1. RIGID CONDUIT: All rigid galvanized steel conduit shall have threaded fittings with insulated bushings.
 2. EMT CONDUIT: Provide insulated bushings for all EMT conduit 1" or larger or housing #6 or larger wires.

3. GROUNDING: Provide fitting with grounding lug where conduit attaches to a painted box (disconnect switch, starter, transformer case, etc), conduit attaches to a box through a knockout which has an associated larger knockout or a reducing washer is used, or conduit contains a feeder from switchgear to switchgear or between switchgear and transformer.
 4. TELEPHONE AND DATA CONDUIT: Provide protective bushing on the end of telephone, data, sound system or other conduit stubbed into the ceiling cavity.
- E. SPARE CONDUIT: Provide five empty 1" conduit from all recessed electrical panels to above the nearest accessible ceiling.
- F. LOW VOLTAGE CONDUCTORS: Low voltage conductors may be run in accessible ceilings without conduit. Provide conduit sleeve with protective end fittings through all walls and floors where raceway system is not installed. All exposed conductors shall be in conduit. All splices shall be in supported junction boxes. Low voltage conductors installed without conduit shall be independently supported on ring hangers, and plenum rated. Low voltage conductors for audio and data wiring shall be stranded unless otherwise recommended by the manufacturer.

2.3 PULL BOXES

- A. REQUIRED: Pull boxes, junction boxes, wiring troughs and cabinets wherever required for proper installation of various electrical systems. Maximum two 90-degree turn allow without pull box. Indoor and outdoor pull boxes are not shown on the plans. Contractor shall provide indoor and outdoor pull boxes per this Project Manual. All outdoor in-ground pull box shall be concrete in-ground pull box with traffic rated cover.
- B. CONSTRUCTION: Made of code gage steel with sides formed and welded, screw covers unless shown to have hinged doors. Hinged doors to be same as furnished on panel boards, with same locking device. Knockouts shall be factory made or formed in field with a cutting tool which will provide a clean, symmetrically cut hole. Do not gang boxes or use extension rings to increase capacity.
- C. DUCTBANK MANHOLES AND PULL BOXES: Install manholes and pull boxes in accordance with the manufacturer's written installation instructions. Manholes shall be rigidly supported and level with the top of manhole rings flush with finished paving or grade at the point of installation. Seal all joints and openings to prevent the entry of water.
- D. PRECAST CONCRETE MANHOLES:
1. General: Provide precast concrete manholes as detailed on the Drawings and as required for installation of new ductbank systems and connection to existing ductbank systems at locations shown on the Drawings.
 2. Manholes shall be steel reinforced and the complete manhole assembly shall be designed for H-20-44 bridge loading. Submittals shall clearly indicate all dimensions and reinforcing steel.
 3. Concrete: Manholes shall be constructed using concrete with a 4500 psi 28 day strength. Concrete mix shall be designed in accordance with ASTM standards.
 4. Reinforcing Steel: Steel shall be intermediate or hard grade billet steel conforming to ASTM A15, deformed in accordance with ASTM A305.
 5. Manholes: Manhole and pull box covers shall be cast iron cover mounted in a 30" Type "B" or "WRM" frame and shall be traffic type for heavy vehicular traffic. The frame and neck shall be doweled into the manhole to prevent movement away from the opening. Power manhole and pull box covers shall be marked "ELECTRIC". Communication manhole and pull box covers shall be marked "COMMUNICATIONS". Voice manhole and pull box covers shall be marked "TELEPHONE". Data manhole and pull box covers shall be marked "DATA".

6. Conduit Entry: Plastic conduits shall include a bell end inside the manhole or pull box, mounted flush and grouted to seal openings. Precast fiber type terminators shall be provided for each ductbank entry.

7. Grounding: A minimum #4/0 bare copper ground wire shall penetrate the side wall in the bottom section of each manhole and pull box and extend 48" inside and outside of the manhole pull box.

8. Accessories: Knockouts, cable racks, sumps, steps, joint seals and other accessories required for a complete installation shall be provided.

2.4 OUTLET BOXES

- A. REQUIRED: For all switches, light fixtures, receptacles and the various other outlets shown.
- B. CONSTRUCTION: Galvanized steel, one piece construction, in all cases suitable for intended use. Provide "gang" boxes where devices are shown grouped. Use hot dipped galvanized cast iron for floors or exterior locations.
- C. TYPES FOR VARIOUS LOCATIONS:
 - 1. CEILINGS: 4" square, 2-1/8" deep.
 - 2. DRY WALLS: 4" square, 2-1/8" deep standard galvanized switch box. Provide shallow boxes where necessary. Provide tab to align box with studs.
 - 3. MASONRY WALLS: Galvanized switch boxes designed especially for masonry installations. Depths of boxes must be properly coordinated for each specific installation. Box shall be installed within 1/8" of surface of block.
 - 4. FLOOR: Watertight, adjustable, cast iron.
 - 5. SURFACE MOUNTED: Boxes surface mounted on walls or floor shall be Bell, cast aluminum box with appropriate plate and threaded hubs.
 - 6. BACK-TO-BACK OUTLETS: Outlets shown back-to-back on the drawings are to be installed with a minimum of 6" of lateral separation between outlets for minimum sound transmission. "Through-the-wall" type boxes are not permitted.
 - 7. SPECIAL: Boxes for VGA outlets shall have 1.25" knockouts/lugs.
- D. MOUNTING PLATES: Boxes mounted in drywall construction shall have extension plates matched to wall thickness so the box can be mounted flush with the metal stud and the wiring device mounts flush with the wall.

2.5 CONNECTIONS TO MOTORS, EQUIPMENT AND DEVICES

- A. POWER WIRING: Make wiring connections to all mechanical, plumbing and other equipment being installed as a part of this Contract. In addition, make connections to Owner furnished equipment as shown.
- B. CONTROL WIRING: Control and interlock wiring for HVAC Systems will be provided by the Mechanical Contractor. Motorized dampers of the same voltage as the associated fan shall be wired by the electrical contractor when the damper is in close proximity to the fan. Under this section provide a 20 amp, 120 volt circuit to the control panel in each mechanical room from the local low voltage panel.

- C. CONNECTIONS TO EQUIPMENT: Make connection to each motor and motor starter. Each piece of equipment subject to vibration shall have not less than 18" nor more than 24" of flexible conduit. All horizontal runs of conduit (not strapped to walls) must be kept above 7 feet high, with a vertical drop to equipment. Conduit blocking walk and service space is not acceptable and will require relocation. Conduit on and adjacent to equipment must be located to allow free access to all removable panels for equipment service. Wire adjacent to heat producing equipment, such as boilers and electric heaters, must be of a type approved for this use.
- D. CONNECTIONS TO TRANSFORMERS: Install not less than 18" nor more than 24" of flexible conduit at each connection to floor mounted transformers.
- E. CONNECTIONS TO RECEPTACLES: All multiple devices on a circuit such as receptacles shall be back wired with pigtail so device does not provide continuity path.
- F. CONNECTIONS TO UPS(s): Coordination for UPS(s): General Contractor shall coordinate with electrical contractor to provide matching twist lock plugs, twist lock receptacle, circuits and circuit breakers per submit UPS(s) at no additional cost to Owner during Contractor period. No exception. For Example, the plan indicated 208, 30A circuit and outlet for each UPS. If UPS required to be 208V, 50A (Larger) to handle the load per IT supplier calculation, Contractor shall revise the CB(s), electrical devices and circuit at no additional cost to Owner. GC must bring this to the attention of the Electrical Contractor during bidding period.
- G. CONNECTIONS TO FURNITURES: Electrical contractor to provide hard wiring to connect to furnitures with power connection requirement. These connections are not on the electrical plans. Contractor shall obtain a furniture plans from Architect and furniture supplier to coordinate and provide all the final electrical hard wiring and connections. Include this requirement in base proposal. No Exception.

2.6 CONDUCTORS

- A. REQUIRED: A complete system of conductors in all raceway systems except where shown otherwise. No conductors are to be installed in telephone conduit. Emergency or exit circuitry shall be installed in a separate raceway system.
- B. BUILDING WIRE: 600 Volt, soft drawn annealed copper, 98% conductivity, continuous from outlet to outlet. Minimum wire size #12 except remote control wire may be #14. All wire shall be stranded Type THHN, THW-2 or THWN-2 (wet rated for 90° C). All wires shall be color coded with same color connected to same ungrounded phase throughout the installation.
- C. All main feeders for generator power from generators to generator power distribution equipment and transfer switches and from transfer switches to emergency power distribution panels and main feeders to fire pump shall be type RHW 2 hour rated conductors in a suitbale raceway and installed in continuous 2 hour rated vertical chases or stacked 2 hour rated electrical rooms. Exception: Conduit and emergency feeders installed underground with red concrete encased do not need to have type RHW 2 hour rated conductors.
- D. BURIED GROUND WIRE: Conductors used to interconnect ground rods of a grounding triad or supplemental ground loop shall be minimum #2, bare, tinned, solid copper wire. Connect this wire to rod with short length of same wire, thermo-welded to loop and rod.
- E. MANUFACTURERS: Cerro, Encore, Republic, Triangle, Southwire Co. and United

- F. CONNECTORS: Make all connections on #10 and smaller wire with Code approved solderless pressure type insulated connectors; Ideal Wingnut. Solderless lugs must be used for all terminations.
- G. TEST: After installation of all conductors, and before final acceptance, make such tests as are required to determine proper functioning of all circuits. Furnish all necessary instruments required to make such tests and correct any deficiencies found.
 - 1. Feeder Insulation Resistance Test
 - 2. Neutral Testing
 - 3. Neutral Testing
 - 4. Pre-energization Check
 - 5. Voltage and Current Values
 - 6. Submittals: Contractor shall furnish all instruments and personnel required for tests. Submit four copies of certified test results to Architect for review. Test reports shall include conductor tested, date and time of test, test results, relative humidity, temperature, and weather conditions.

2.7 CIRCUITRY

- A. The intent of the drawings is to indicate schematically the circuitry required.
- B. Install a dedicated neutral for each circuit requiring a neutral. The ungrounded and neutral conductors of a multiwire branch circuit must be grouped together by cable ties and circuit number tags at the point of origination in side electrical panel. Do not install more than four current carrying conductors in a conduit except nine #12 or #10 conductors may be installed in 3/4" or larger conduit. Install a dedicated neutral for each circuit serving electronic data processing equipment, lighting dimmers and motors. Segregate data processing circuits from other types of circuits. Do not install 480/277 volt conductors in the same conduit with 208/120 volt conductors. Install a green ground wire for each circuit or group of circuits in one conduit.
- C. The work performed in grouping conductors in a single raceway shall comply with all applicable articles in the latest edition of the NEC and Local Codes which shall include, but shall not be limited to, ampacity de-rating of conductors and maximum capacities of raceways.

2.8 POWER CONDUCTOR COLOR CODING

- A. 480/277 VOLT SYSTEM: Conductors shall have insulation of the proper color as listed below:

Phase A	- Brown
Phase B	- Purple
Phase C	- Yellow
Neutral	- Natural Gray
Ground	- Green
Isolated Ground	- Green w/yellow stripe
- B. 208Y/120 VOLT SYSTEMS: Conductors shall have insulation of the proper color as listed below:

Phase A	- Black
Phase B	- Red
Phase C	- Blue
Neutral	- White
Ground	- Green
Isolated Ground	- Green w/yellow stripe
- C. 240/120 VOLT DELTA SYSTEMS

Phase A	- Black
Phase B	- Orange (high leg of delta)
Phase C	- Blue
Neutral	- White w/colored stripe
Ground	- Green
Isolated Ground	- Green w/yellow stripe

- D. Contractor may use colored tape marking for size 8 and larger phase and neutral conductors, and size 4 and larger ground conductors.
- E. Switch legs are to be color coded the same as the un-switched phase, i.e., all wiring from lighting control panels and contactors shall retain the phase color.
- F. If existing construction has a consistent but different color coding, match existing.

2.9 SPECIAL SYSTEMS CABLE COLOR CODING

A.	Fire Alarm	Red
B.	P/A Communications	White
C.	Misc Low Voltage/Sound	Gray
D.	Data Cabling	Blue
E.	Fiber Optics	Black installed in Orange inner duct
F.	Fiber Patch Cables	Orange
G.	Security Wiring	Purple
H.	CCTV Wiring	Black
I.	CATV Wiring	White
J.	BMCS (EMS)	Yellow (varying shades of Yellow for trouble shooting)
K.	Access Control	Purple

2.10 GROUNDING

- A. GENERAL: Permanently and securely ground the mechanical and plumbing equipment and piping systems, conduit system, panel boards and all other components of the electrical system installed or connected by the Sub-contractor. Follow NEC and building code requirements. Splicing is strictly prohibited for grounding wire.
- B. CIRCUIT GROUNDS: Provide a green ground wire sized per the NEC for every circuit.
- C. EQUIPMENT ENCLOSURES: Make firm ground to raceway system and cable trays. Equipment connected with flexible conduit or sealtite, shall have the specified ground wire installed inside conduit. Do not wrap on the outside of the conduit.

- D. TRANSFORMERS: Each transformer shall have its enclosure and secondary neutral terminal (except when a neutral terminal does not exist) bonded to the building steel and local, driven ground rod.
 - E. SYSTEM GROUND: Ground system neutral in service entrance equipment to the building steel and three 3/4" x 10 foot, copperclad, driven ground rods. Install ground rods outside in an equilateral triangle pattern, 10 feet on a side, with rod tops 12" below grade. Connect ground wire from rod to rod in a complete loop then extend to service equipment. Use cadweld connections below grade. Refer to drawings.
 - F. DATA SYSTEM GROUNDING: At each MDF and IDF provide a 24"x3"x1/4" copper ground bar mounted to the wall with isolating standoffs. Provide eight lugs for connecting ground wires up to #6 AWG. Ground the IDF Room bars to the MDF ground bar with #3/0 AWG daisy chained from bar to bar. Ground the MDF ground bar to the service ground bar in the main switchboard with #3/0 AWG.
 - G. ELECTROMAGNETIC SHIELDING: In rooms painted with EMI shielding paint provide grounding system between the painted walls and the local ground bar. These areas include MDF and IDF rooms. Provide Ground-Connection-Set ESK manufactured by Less-EMF Inc. Kit consists of a plate mounted to the wall, with a continuous Conductive Tape extending from the ground bar and attached each wall completely around the room. The mounting plate shall be electrically connected to the room ground bar with the included cable. Refer to manufacturer's instructions for complete details of the installation.
 - H. RACEWAY/STEEL CONDUIT: All grounding wires shall be enclosed on a steel raceway and use proper lugs, cadweld, and ground clamps.
 - I. GROUND WIRE CONDUIT: Conduit containing a ground wire shall be grounded at each end to the ground wire.
 - J. TELEPHONE GROUND: Install a #6 ground wire from the telephone board to the MDF ground bar.
 - K. SOUND SYSTEM GROUND: Install a #6 ground wire from the amplifier equipment to the ground bar in the Service Entrance Equipment.
 - L. METAL FENCES: Provide bonding and grounding for metal fences per NEC and OSHA requirement. Provide minimum a #6 ground wire from building main ground bar to metal fences. Bond all each piece of metal fence together. Fences doors shall be bonded and grounded at open and close positions.
- 2.11 EXCAVATING, TRENCHING AND BACKFILLING:
- A. General: The work hereunder includes whatever excavating and backfilling is necessary to install the electrical work. Coordinate the electrical work with other work in the same area, including excavating and backfilling, dewatering, floor protection provisions, other temporary facilities, other underground services (existing and new), landscape development, paving, structural foundations, and floor slabs on grade. Coordinate with weather conditions and provide temporary facilities needed for protection and proper performance of excavating and backfilling.
 - B. Standards: Except as otherwise indicated, comply with the applicable provisions of Division 2 for electrical work excavating and backfilling. Refer instances of uncertain applicability to the Architect/ Engineer for resolution before proceeding with the Work.

- C. The bottoms of trenches shall be excavated to required depths, slope and grade. The bottom of the trench shall be accurately excavated to provide firm, uniform bearing for the bottom of the raceways and ductbanks. Where mud or unstable soil is encountered in bottom of trench, it shall be removed to firm bearing and the trench shall be backfilled with bedding sand to proper grade and tamped to provide uniform firm support.
- D. The bottom of trenches shall be accurately graded to provide proper fall and uniform bearing and support for each section of the conduit on undisturbed soil or 2" of sand fill at every point along its entire length. In general, grading for electrical ductbanks and conduits shall be from building to manhole, and from a high point between manholes to each manhole.
- E. Exercise care not to excavate below required depth, leaving a flat bed of undisturbed earth, firm and secure, before laying cable, and ductbanks. In the event rock is encountered, excavate 6" below required depth and backfill to required depth with bedding sand, and compact to minimum 95% compaction and shall provide soil density test.
- F. All grading in the vicinity of excavation shall be controlled to prevent surface ground water from flowing into the excavations. Any water accumulated in the excavations shall be removed by pumping or other acceptable method. During excavation, material suitable for backfilling shall be stacked in an orderly manner a sufficient distance back from edges of trenches to avoid overloading and prevent slides or cave-ins. Material unsuitable for backfilling shall be wasted and removed from the site and properly disposed of at contractor's expense.
- G. The Contractor shall be fully responsible for the safety of persons, materials and equipment in or near trenches or other excavations and provide all required sloping, shoring, railings and other protective provisions. The Contractor shall provide a trench shoring plan and design which is sealed by a registered professional engineer. Refer to Divisions 1 and 2 for additional requirements.
- H. If any unknown and/or uncharted utilities are encountered during excavation, promptly notify Architect/ Engineer and wait for his instructions before proceeding.
- I. If such unknown utilities are encountered and work is continued without contacting the Architect/ Engineer for instructions, and damage is caused to said utilities, the Contractor shall repair at his own expense, such damage to the satisfaction of the owner or utility company concerned.
- J. Trenches shall not be backfilled until all required tests have been made by the Contractor and approved by the Architect/Engineer and any local authorities having jurisdiction.
- K. Backfill shall be compacted or cement stabilized sand up to 6" above the top of conduit or ductbank. Backfill up to grade shall be in maximum 6" lifts with minimum 95% compaction of lifts. Refer to Division 2 or elsewhere in Contract Documents for additional trenching and backfill requirements.
- L. Opening and Reclosing Pavement, Landscape Areas and Lawns: Where excavation requires the opening of existing walks, street, drives, other existing pavement or lawns, such surfaces shall be cut as required to install new conduit and to make new connections to existing conduits. The sizes of the cut shall be held to a minimum, consistent with the work to be accomplished. After the installation of the new work is completed and the excavation has been backfilled and flooded, the area shall be patched or replaced, using materials to match those cut out or removed. Patches shall thoroughly bond with the original surfaces, shall be level with them, and shall meet all the requirements established by the authorities having jurisdiction over such areas. All removed work shall be replaced by craftsman who regularly install the types of work being replaced.

- M. Excavation in Vicinity of Trees: All trees including low hanging limbs within the immediate area of construction shall be adequately protected to a height of at least 5' to prevent damage from the construction operations and/or equipment. All excavation within the outermost limb radius of all trees shall be accomplished with extreme care. All roots located within this outermost limb radius shall be brought to the attention of the Architect before they are cut or damaged in any way. The Architect will give immediate instructions for the disposition of same. All stumps and roots encountered in the excavation, which are not within the outermost limb radius of existing trees, shall be cut back to a distance of not less than 18" from the outside of any concrete structure or pipeline. No chips, parts of stumps, or loose rock shall be left in the excavation. Where stumps and roots have been cut out of the excavation, clean compacted dry bank sand shall be backfilled and tamped.

2.12 ELECTRICAL SYSTEM IDENTIFICATION:

A. Identification of Equipment:

1. All pieces of major electrical equipment shall have a manufacturer's label identifying the manufacturer's address, equipment model and serial numbers, equipment size, and other pertinent data. Care shall be taken not to obliterate this nameplate in any way.

2. The Contractor shall make it possible for the personnel operating and maintaining the equipment and systems in this project to readily identify the various pieces of equipment, junction boxes, etc., by marking them. All items of equipment, pull boxes, junction boxes, etc., shall be clearly marked using engraved nameplates as hereinafter specified. The item of equipment shall indicate the same number as shown on the Drawings, where applicable.

3. White background and black letters equipment nameplates shall be three ply laminated plastic, a minimum of 3/32" thick, black background, white letters for normal power, orange background, white letters for emergency power, and blue-white-blue for UPS power. Letters shall be similar to Roman Gothic of a size that is legible (1/2" minimum for main nameplates and 3/8" minimum for branch device nameplates) and appropriate to the application. Attachment of nameplates shall be by stainless steel screws. Rivets or adhesives are not acceptable. Nameplates on equipment installed in finished areas shall be installed inside equipment. Verify location with the Engineer.

a. Electrical equipment to be identified includes: All switchboards, distribution panels, transformers, motor control centers, panelboards, automatic transfer switches, disconnect switches, motor controller/starters, lighting control panels, pull boxes, junction boxes, and similar equipment.

b. Nameplates on switchboards, automatic transfer switches, transformers, distribution panels, motor control centers, disconnect switches, motor controller/starters, and panelboards shall give voltage and current characteristics and the source feeding the panel. Current characteristics shall indicate the size of the overcurrent devices serving the equipment and not the equipment current rating.

Example:

PANEL 1LA
120/208V, 3 PH, 4 W, 225 A
Fed from: DPA-3
Located: Elect Room 1.102

c. Nameplates Individual overcurrent devices and pilot lights in switchboards, distribution panels, motor control centers, and similar equipment shall have nameplates showing the load served and its location, where remote. Nameplates on motor starters shall indicate variable speed, time delay operation, etc., where applicable.

d. Blank nameplates shall be mounted on each spare or bussed space in motor control centers, and on each spare or space in distribution panels.

e. Branch circuit panelboards shall have neatly typed circuit directories behind clear plastic. Identify circuits by room numbers. Room numbers shall be those finally selected by the Owner; not necessarily those given on contract Drawings. Spares and spaces shall be indicated with erasable pencil; not typed. Circuit numbers shall be provided in the directory and at each circuit breaker.

- B. Conduit Systems: Provide adequate marking of major conduit which is exposed or concealed in accessible spaces, to distinguish each run as either a normal power, emergency power, fire alarm, control wiring or voice/data conduit. Except as otherwise indicated, use white banding with black lettering except that emergency power orange and white, fire alarm conduit markers shall use red banding. Provide self-adhesive or snap-on type plastic markers. Indicate voltage ratings of conductors exceeding 250 volts. Locate markers at ends of conduit runs, near switches and other control devices, near items of equipment served by the conductors, at points where conduit passes through walls or floors, or enters non-accessible construction and at spacings of not more than 30' along each run of exposed conduit.
- C. Cable Tray Systems: Provide engraved nameplates identifying cable tray systems as to use, on maximum 50' centers on all tray systems and whenever a tray enters a room or concealed accessible location. Nameplate text shall be submitted to the Engineer for review.
- D. Underground Cable Identification: Bury a continuous, preprinted, red and silver metallic ribbon cable marker, Brady No. 91600 Series or an approved equal with each underground cable (or group of cables), regardless of whether conductors are in conduit or direct buried. Locate each directly over cables, 12" above cable below finished grade. Ribbons shall be detectable from above grade using a pipe or cable locator.
- E. Cable/Conductor Identification: Coordinate a uniform and consistent scheme of color identification of power wiring throughout the building system. Identification shall be by the permanent color of the selected covering. On large conductors, secure identification by means of painted color banding or plastic tape.

1. Color scheme shall be as follows, [or as required to match the existing color coding in the building for 120/240 V systems with high leg provide Orange for phase B]:

208/120 Volt
Phase A Black
Phase B Red
Phase C Blue
Neutral White
Ground Green

480/277 Volt
Phase A Brown
Phase B Purple
Phase C Yellow
Neutral Gray
Ground Green

2. Wiring for switches shall be same color as phase wire.

3. Colored insulation in sizes up through #4. Conductors #3 and larger may have black insulation, but color coded with 1/2" wide band of colored tape, at accessible locations. Rap conductor minimum 6" width.

4. Feeder cables shall be tagged in pull boxes, wireways, wiring gutters of panels, and at other accessible locations. Tags shall be fireproof, nonconductive material, approved by Architect.
 5. Maintain same conductor color from service entrance to last device.
- F. Phase Rotation: Phase rotation shall be maintained throughout the project.
1. Phase rotation shall be clockwise or counterclockwise, per serving power company standards, A-B-C, and identified as such left-to-right, top-to-bottom, and front-to-back with color coding as specified above at switchboards, panelboards, transformers, motor control centers, motor starters, and similar locations.
 2. Motor phase reversal, if necessary, shall be made at motor controller.
- G. Branch Circuit and Control Wiring Tags: All branch circuit and control wiring conductors shall be tagged using self-sticking vinyl cloth or mylar cloth wire markers. Embossed pressure sensitive plastic or metal ribbon markers will not be accepted. Tags shall be installed at all wiring splice, tap and termination points and shall correspond to the designations shown on the control wiring diagrams or panel schedules.
- H. Branch Circuit Pull Boxes and Junction Boxes: Branch circuit pull boxes shall be neatly stenciled with a black permanent marker indicating the panel name and branch circuit number. Boxes on emergency power systems shall be painted orange prior to marking. Boxes on fire alarm power systems shall be painted red prior to marking.
- I. Miscellaneous Switch Plates or Device Plates: Device and switch plates for all 15 and 20amp devices circuited to "emergency" and "normal" circuits, special purpose outlets, pilot lights, remote operated light switches, all remote control devices, and other devices noted on the Drawings shall be identified by engraving the switch plate or device plate.
1. Nomenclature shall include the panel and circuit of the outlet or switch, or the indication of the pilot, or the area of control, or equipment served. Consult the Architect/Engineer for label nomenclature.
 2. Provide Plates for all Wiring Devices
 3. Engraving shall be 3/16" condensed Gothic and shall be filled with black enamel.
- J. Manufacturers: Provide electrical identification products as manufactured by Ideal, T&B, 3M, Panduit, Seaton, EMED Co. or an approved equal.
- K. WARNING SIGNS AND OPERATIONAL TAGS:
1. Warning Signs: Provide warning signs where there is hazardous exposure associated with access to or operation of electrical facilities. Provide text of sufficient clarity and lettering of sufficient size to convey adequate information at each location; mount permanently in an appropriate and effective location. Comply with recognized industry standards for color and design.
 2. Operational Tags: Where needed for proper and adequate information on operation and maintenance of electrical systems, provide tags of plasticized card stock, preprinted. Tags shall convey the message, example: "DO NOT OPEN THIS SWITCH WHEN BURNER ISOPERATING".

END OF SECTION

SECTION 26 06 00 – ELECTRICAL SWITCHGEAR

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 - MATERIALS AND METHODS

2.01 DISTRIBUTION PANELS

- A. GENERAL: Construction in accordance with NEMA standards. Panels and circuit breakers shall be listed for use with 75° C wiring. All products shall be manufactured in the United States.
- B. CABINETS: Panelboard assembly shall be safety dead front type, enclosed in a code gauge steel cabinet with removable end walls. Fronts shall be of code gauge, full-finished steel with rust-inhibiting primer and baked enamel finish. Provide locking door unless panel is located in a mechanical room. Provide the largest cabinet available for the ampacity panel schedules. Provide NEMA 1 enclosure for panels in mechanical room. Provide NEMA 3R enclosure outdoor. Provide NEMA 4XSS enclosure or NEMA stainless steel cover as noted on the panel schedules for electrical panels located in kitchen, machine shop and tool rooms.
- C. BUSSING: Bus structure and main lugs shall have current ratings as shown on the panelboard schedule. Such ratings shall be established by heat rise tests with maximum hot spot temperature on any connector or bus bar not to exceed 50 degrees C rise above ambient. Heat rise tests shall be conducted in accordance with Underwriters' Laboratories Standard UL 67. Phase busses, solid neutral and ground buss shall be silver plated copper braced for the scheduled fault current (50,000 amperes minimum). Provide scheduled short circuit rating per short circuit analysis shown on the plans if higher short circuit value is calculated by engineers. Bussing shall accept the largest circuit breaker available for the ampacity scheduled even though only smaller size CB's are listed. Where space only is shown, bussing shall allow any combination of 1, 2 and 3 pole circuit breakers of various frame sizes.
- D. CIRCUIT BREAKERS: Circuit breakers shall bolt in or have Square D I-Line plug on construction. Circuit breakers shall be equipped with individually insulated, braced and protected connectors. Tripped indication shall be clearly shown by the breaker handle taking a position between ON and OFF. Trip ratings of the circuit breaker shall be as shown on the panelboard schedule. All spaces shown shall include all buss connectors and any other provisions necessary for future breaker additions. **Circuit breaker 800A and larger shall be 100% rated.** Minimum 18,000 amperes interrupting capacity for circuit breakers 100A and larger.
- E. ADJUSTABLE TRIP CIRCUIT BREAKERS:
 - 1. GENERAL: When adjustable trip circuit breakers are provided, manufacturer shall provide system coordination study with recommended settings as part of electrical switchgear submittal for engineer review.
 - 2. INSTALLATION: Contractor shall notify Owner when adjustable trip settings are installed for each adjustable trip circuit breaker. When adjustable trip settings are preset from the factory the contractor shall provide written documentation certifying that all adjustable trip settings have been set in accordance with the system coordination study.

3. CLOSEOUT DOCUMENTS: Provide system coordination study and installed trip settings with O&M Manuals for each adjustable trip circuit breaker.
4. WARRANTY: During the warranty period the contractor shall provide and install new adjustable trip settings as required at no cost to the owner.
- F. SURGE SUPPRESSION: Panels noted to have integral or external TVSS or SPD surge suppression shall include TVSS/SPD. For externally mounted TVSS/SPD, Contractor shall provide minimum 30A/3P circuit breaker in panel to connect to TVSS/SPD.
- G. NAMEPLATES: Provide lamacoid nameplate for panel stating name, voltage, amps & bracing. Provide lamacoid nameplate for each device and space stating equipment served and trip setting. Attach with mastic and two screws.
- H. ACCEPTABLE MANUFACTURERS: GE, Eaton, Siemens or Square D.

2.02 LIGHTING PANELS

- A. GENERAL: Circuit breaker type; Square D Type NQOD for 120/208-240 Volts, NF for 277/480 Volts. Construction shall comply with NEMA and U. L. Standards. Panels and circuit breakers shall be listed for use with 75° C wiring. Mount panel with top of can at 72" above finished floor. All products shall be manufactured in the United States.
- B. CABINETS: Safety dead front type with front hinged to box; box made of code gage galvanized steel; provide wire bending space per NEC Table 373-6; door with flush type combination lock and latch, all keyed alike.
- C. CIRCUIT BREAKERS: Plug in for 120/208-240 Volts, bolt in for 277/480 Volts; quick make, quick break, trip free, thermal magnetic trip; automatic tripping indicated by handle at midpoint position; multi-pole breakers to have common trip (handle ties are not acceptable). Minimum interrupting ratings shall be 14,000 Amps symmetrical at 277/480 Volts and 10,000 Amps symmetrical at 120/208-240 Volts. Provide scheduled short circuit rating per short circuit analysis shown on the plans if higher short circuit value is calculated by engineers. All main circuit breakers shall be rated 22,000 Amps minimum. Ratings as scheduled on drawings. Square D I-line construction with plug on breakers is acceptable for 277/480 Volts. Install circuit breakers in same order as shown on the drawings. Where spaces are noted, provide bus connectors and all other provisions necessary to add future breakers of any size and number of poles up to 100 amp and three poles.
- D. BUSSING: Silver plated copper bussing, solid neutral and ground buss sized in accordance with NEMA temperature rise standards and installed completely throughout panel for installation of future breakers where schedule shows space only. Lugs U. L. rated for Cu/Al terminations. Unless indicated otherwise on drawings, bus bracing shall be 22,000 Amps symmetrical. Panels with 24 or more circuits shall have a minimum of 225 Amp bussing. Provide a ground bar in the Service Entrance Equipment and in each electrical panel having a branch circuit ground wire.
- E. SURGE SUPPRESSION: Panels noted to have TVSS surge suppression shall include TVSS internally mounted in panel housing wired to buss. Where TVSS cannot be internally mounted provide externally mounted TVSS in NEMA1 enclosure wired to 30A/3P circuit breaker in panel.
- F. DIRECTORY: Complete at end of job, typewritten, stating equipment or rooms served by circuit. Type even circuits on right side of card, odd on left side.
- G. FINISH: Gray enamel over rust inhibiting treatment after fabrication and before assembly. After installation, and before acceptance by the Owner, assembly shall be painted with a rust inhibiting paint (color selected by Architect). Recessed cans may have galvanized finish.

- H. NAMEPLATE: Provide lamacoid nameplate with 5/16" letters on front face showing panel name and voltage. Attach with mastic and two screws. Coordinate to give same name as shown on panelboard schedule. Example:

Panel LA 225 MCB
120/208 Volts, 3 Phase, 4 Wire
Feed from DPA-2
Room 1.102

- I. ACCEPTABLE MANUFACTURERS: GE, Eaton, Siemens or Square D.

2.04 SURGE PROTECTION DEVICES (SPD)

- A. GENERAL: Provide SPD equipment for electrical panels and equipment as noted on the Drawings. TVSS shall be installed internally to electrical panels or in NEMA 1 housing and mounted adjacent to the equipment to be protected. Connect SPD to three pole circuit breaker in the panel with wiring as short and straight as possible.
- B. DISPLAY: Provide digital transient counter with battery backup.
- C. SUPPRESSION MODES: System shall provide suppression of L-L, L-N, L-G and N-G transients.
- D. RESPONSE TIME: 1 nanosecond or less.
- E. EMI/RFI ATTENUATION: 38 dB or better.
- F. WARRANTY: 10 year, non-prorated replacement.
- G. TVSS RATING:
 - 1. Panels 800 amps and smaller: 160 kAmps per phase
 - 2. Panels larger than 800 amps: 320 kAmps per phase
- H. ACCEPTABLE MANUFACTURERS: GE, Eaton, Siemens or Square D.

2.05 TRANSFORMERS, DRY TYPE

- A. GENERAL: Provide U. L. labeled, plated copper wire wound, two winding type units, NEMA 3R construction suitable for mechanical room damp/wet location installed. Refer to Drawings for KVA ratings. Refer Drawings for K=4, K=13 and Isolation XFMR Ratings. All products shall be manufactured in the United States. Transformer must be an ultra-efficient that exceeds the U.S. Dept. of Energy's new and more stringent efficiency legislation effective Jan. 1, 2016. Transformer shall also be manufactured in an advanced ISO 14001 certified facility.
- B. Shield: Provide an electrostatic shield between the transformer primary and secondary to attenuate source side line interference for transformers indicated to be shielded and for all transformers with a K-factor rating greater than 1.0
- C. TEMPERATURE RISE: Design shall use 220° C insulation and operate with a maximum temperature rise of 115° C above a 40° C ambient.
- D. TAPS: High voltage windings shall be provided with two 2½% taps FCAN and four 2½% taps FCBN.

- E. NOISE: The manufacturer shall properly isolate the core and coil from the enclosure with vibration isolation pads in order to minimize the transmission of vibration and noise. Noise levels shall not be more than NEMA and ANSI Standards.
- F. IDENTIFICATION: Install lamacoid nameplate with 5/16" letters on front face showing transformer name and voltage. Attach with mastic and two screws. Coordinate to give same name as shown on drawings. Example:

Transformer XA 112.5 KVA
480V-208Y/120 Volts, 3 Phase, 4 Wire
Feed from DPA-3
Room 1.103
- F. MANUFACTURERS: GE, Eaton, Siemens or Square D.

2.06 FUSED AND SAFETY SWITCHES

- A. GENERAL: Provide disconnect switch for each motor, motor starter, electric duct heater and other equipment required by the NEC, fusible or non-fusible as required. Where motor circuit protective device is in the same room, within 50 feet of and in sight of the equipment, no additional switch is required; if those conditions do not prevail provide switch at the equipment and as indicated on Drawings. Equipment shall be listed for use with 75° C wiring. Disconnect switches for motors controlled by variable frequency drives shall have auxiliary "early break" contact to turn off VFD when motor is disconnected. All products shall be manufactured in the United States.
- B. TYPE: Heavy duty switch sized for load served; non-fusible where used purely as disconnect device. Fused switches shall accommodate Class RK1 fuses. NEMA 3R enclosure for switches in mechanical rooms, NEMA 3R for switches outside unless noted to be NEMA 4X on the Drawings. Also, provide NEMA 4X for switches in shops, labs, classrooms as noted on the plans. Switches located in the kitchen area shall be NEMA 4X stainless steel. Switches in the pool area and pool equipment area shall be non-metallic NEMA-4X.
- C. FUSES: Fuses to 600 amps shall be low peak, dual element, time delay fuses – LPS Class RK1. Larger fuses shall Limitron KTU Class L fuses. Provide 10% spare fuses of each size, minimum of three per size. Install in cabinet in main mechanical room.
- D. NAMEPLATE: Provide each device with an engraved lamacoid nameplate (5/16" high letters) showing load served. Attach with mastic and two screws.
- E. MANUFACTURERS: GE, Eaton, Siemens or Square D.

2.07 CONTACTORS

- A. GENERAL: Contactors shall have poles and rating consistent with the load being served but shall have a minimum of three poles, 30 amps (20 amps tungsten) per pole at 600 volts. The load may consist of all types of ballast and tungsten lighting, resistance and motor loads.
- B. CONTACTS: The unit shall have 100% rated double-break, silver-cadmium-oxide power contacts, field convertible from N.O. to N.C. and vice-versa and with clearly visible N.O. and N.C. contact-status indicators.

- C. CONTROL: The unit shall be electrically held installed in a NEMA 1 enclosure. List circuits controlled inside enclosure. Coil voltage shall match load voltage so control power comes from circuit controlled. Provide 120 volt coil and controls transformer with input and output fusing. Provide HOA switch to allow manual control of lights. List circuits controlled inside enclosure. Provide indicator lights on the front enclosure.
- D. Pilot Lights: Provide green "Off" and red "On" pilot indicator lights on the face of the contactors.
- E. ENCLOSURES: Provide NEMA 1 for standard installations and NEMA 4X for installations outdoors and wet areas including kitchen. Comply with Code requirements for other environments.
- F. ACCEPTABLE MANUFACTURERS: GE, Eaton, Siemens or Square D.

2.07 MOTOR CONTROLLERS

Motor starters and contactors shall be provided under the Mechanical Section, installed under the Electrical Section. Starters installed in motor control centers shall be provided under this section. Locate starters next to electrical panel serving equipment unless shown otherwise. Note that all motors require starters (or contactor if motor is small and single phase).

2.08 NAMEPLATES

In addition to the nameplate specified with the various equipment, provide the following engraved lamacoid nameplate with 5/16" high letters on each lighting panel, distribution panel and transformer:

CAUTION
DO NOT ADD OR MODIFY CIRCUITS WHILE ENERGIZED
THIS PANEL IS POWERED FROM PANEL DA.

Replace PANEL with TRANSFORMER as appropriate. Replace PANEL DA with the actual device as shown on the Drawings.

PART 3 - EXECUTION

3.01 INSTALLATION OF SWITCHGEAR

- A. GENERAL: Install switchgear where shown, in accordance with the manufacturer's written instructions and recognized industry practices to ensure that the switchgear comply with the requirements and serve the intended purposes.
- B. Standards: Comply with the requirements of NEMA and NEC standards and applicable portions of NECA's "Standard of Installation", for installation of switchgear.
- C. Torque bus connections and tighten mechanical fasteners.

- D. Concrete Pads: Install switchgear on a reinforced concrete house keeping pad. The housekeeping pad shall extend 3" beyond the housing of the switchgear unless shown otherwise. Switchgear shall be bolted to the house keeping pad using 3/8" minimum galvanized bolts and anchors on 30" maximum centers. Furnish the exact position of any block outs, dimensions, and location of the housekeeping pads in a timely manner so as to prevent delay of the concrete work.
- E. Adjustment: Adjust operating mechanisms for free mechanical movement.
- F. Finish: Touch-up scratched or marred surfaces to match original finish.

3.02 TESTING

- A. Pre-energization Checks: Prior to energization, check switchgear for continuity of circuits and for short circuits.
- B. Switchgear Insulation Resistance Test: Each switchgear bus shall have its insulation resistance tested after the installation is complete except for line and load side connections. Tests shall be made using a Biddle Megger or equivalent test instrument at a voltage of not less than 1000 volt dc with resistance recorded after 30 and 60 seconds of operation at slip speed. Resistance shall be measured from phase-to-phase and from phase-to-ground. Bus which does not meet or exceed manufacturer's bus insulation resistance specifications shall be repaired or replaced and retested until an acceptable resistance is obtained.
- C. Ground Fault Protection System Test: Following completion of the construction work and prior to final acceptance testing, the ground fault protection system shall be field-tested and reset to the recommended settings in the coordination study for both current and time by a representative of the manufacturer's engineering service department. The field test shall be conducted in a similar manner to the factory test in that a cable from a low voltage, high-current test set shall be passed through each current sensor. The time and current values for the ground fault function of circuit breakers shall be checked against the ground fault characteristic curves and relays which fail to pick-up within the published curves shall be recalibrated or replaced. This test shall also demonstrate the complete system reliability in that the overcurrent devices shall actually open.
- D. Submittals: Contractor shall furnish all instruments and personnel required for tests. Submit four copies of certified test results to Engineer for review. Test reports shall include switchgear tested, date and time of test, relative humidity, temperature, and weather conditions.
- E. Thermographic Testing: Conduct a thermographic test of the switchgear and their connections using an infrared temperature scanning unit. The test shall be performed by an independent testing laboratory (General Electric, Eaton Electrical Systems and Solutions or Siemens Industrial Service). Connections indicating higher temperature levels than are acceptable shall be tightened or corrected as required to eliminate the condition. Conduct test, using test reporting forms, between 6 and 8 months after beneficial occupancy, but in no case beyond the one year warranty period. Correct unacceptable conditions prior to end of the warranty period.

END OF SECTION

SECTION 26 09 26 – LIGHTING CONTROL DEVICES AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 QUALITY ASSURANCE

- A. Product manufacturer shall have a minimum of (5) years' experience in the manufacturing of occupancy sensors.
- B. All components shall be UL listed, meet all state and local applicable code requirements.
- C. All components shall offer a five (5) year manufacturer's warranty.

1.03 ACCEPTABLE MANUFACTURERS

- A. "Stand Alone" Digital Lighting Control System: "Wattstopper" or equal product from "n-Light"

1.04 GENERAL

- A. Provide the quantity of "Stand Alone" digital lighting controller, digital lighting switches, occupancy sensors and power packs required for complete and proper volumetric coverage to completely cover the controlled areas. Contractor shall verify room coverage and ceiling heights with manufacturer and provide the quantity of occupancy sensors as required. Rooms shall have one hundred (100) percent volumetric coverage of small motion detection to completely cover the controlled areas to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only rooms that are to be provided with sensors. Proper judgment must be exercised in executing the work so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural or architectural components. Provide sensors to provide complete and proper volumetric coverage. Sensor wall switches are not allowed.
- B. Stand Alone Digital Lighting Controllers shall be located in accessible ceiling spaces.
- C. In rooms such as Library / Cafeteria with light switches / circuits operating separate areas of room, provide Digital Lighting Controllers and sensor(s) for control of each switched area.
- D. Low voltage cabling is to be green with black stripe in color, Wattstopper LMRJ Series Pre-terminated RJ45 Cables, Plenum Rated.
- E. Where ceilings are above 12 feet provide wall mounted sensors at 10 feet AFF where practical or

shown on prints, and high bay sensors where the wall mounted would not be practical.

PART 2 - MATERIALS AND METHODS

2.01 OCCUPANCY SENSORS AND LIGHTING CONTROL EQUIPMENT

- A. GENERAL: Provide occupancy sensors with associated accessories including Stand Alone Digital Lighting Controllers and Digital Light Switches for rooms noted on the drawings. Units shall be suitable for both 120V and 277V. Refer to the Drawings for proposed layout. Supplier shall have factory review layout, provide additional devices as necessary at no additional cost, and certify the proper operation of the sensor system. Devices shall be factory set at 100% sensitivity and 30 minutes or more minimum ON time.
- B. Stand Alone Digital Lighting Controller: Provide non-Dimming Room Controller for room with non-dimmable light fixtures. Digital Lighting Controller shall have quantity of relays match the number of lighting load in each room. For Example, provide minimum of 3 relays to control 3 lighting loads. Wattstopper LMRC-213 or equal. For room with more than 3 lighting loads, provide additional Digital Lighting Controllers.
- C. Stand Alone Digital Lighting Controller-Dimmable: Provide Dimming Room Controller for room with dimmable light fixtures. Digital Lighting Controller shall have quantity of relays match the number of lighting load in each room. For Example, provide minimum of 3 relays to control 3 lighting loads. Wattstopper LMRC-213 or equal. For room with more than 3 lighting loads, provide provide additional Digital Lighting Controllers.
- D. WALL MOUNTED DUAL CIRCUITS SWITCH OCCUPANCY SENSOR: Dual Circuits to control two lighting loads. Passive infrared type with 180° field of view, tamper resistant lens. Unit shall have no minimum load requirement and fit standard single gang outlet box. Provide LED walk test indicator and one or two electronic OFF-AUTO switches depending on switching arrangement. Unit shall have field adjustable time delay and sensitivity adjustment. Wattstopper LMDW-102 or equal.
- E. WALL MOUNTED SINGLE CIRCUIT SWITCH OCCUPANCY SENSOR: Single Circuits to control only one lighting load. Passive infrared type with 180° field of view, tamper resistant lens. Unit shall have no minimum load requirement and fit standard single gang outlet box. Provide LED walk test indicator and one or two electronic OFF-AUTO switches depending on switching arrangement. Unit shall have field adjustable time delay and sensitivity adjustment. Wattstopper LMDW-101.
- F. DUAL TECHNOLOGY CEILING MOUNTED: Dual technology infrared and ultrasonic detection system. Unit shall have field adjustable time delay and sensitivity adjustment. LMDC-100 or equal depending on room size and configuration. White Finish.
- G. ULTRASONIC CEILING MOUNTED : Ultrasonic detection system for locker rooms and restrooms. Unit shall have field adjustable time delay and sensitivity adjustment. Wattstopper LMUC-100 or equal depending on room size and configuration. White Finish. Provide 120/277V line voltage type sensor and power pack for location with toggle key switch.
- H. CEILING MOUNTED (SMALL ROOMS): Infrared technology with field adjustable timer. Wattstopper LMPC-100 or equal.
- I. CEILING MOUNTED HIGH BAY SENSOR: Wattstopper LMPC-100-5 or equal.

- J. WALL MOUNTED HIGH CEILING AREAS: Wall mounted Infrared detection system rated for ceiling higher than 10 FT. Wattstopper LMPX-100 or equal.
 - K. POWER PACK: Wattstopper BZ-150 or equal.
 - L. EMERGENCY LIGHTING CONTROLLER / GENERATOR TRANSFER DEVICE - GTD: Generator transfer device to transfer power source for light fixture from normal circuit to emergency circuit. Wattstopper ELCU-200 or equal. Note: This is only apply for project with emergency generator.
 - M. EMERGENCY LIGHTING CONTROLLER FOR DIMMABLE LIGHT FIXTURE: Generator transfer device to transfer power source for light fixture from normal circuit to emergency circuit. Device shall disconnect 2-10V dimming control wire when transfer power source from normal power to emergency power Wattstopper or equal. Note: This is only apply for project with emergency generator.
 - N. PHOTOSENSOR: Wattstopper LMLS-500 or equal.
 - O. DIGITAL WALL LIGHT SWITCH:
 - 1. Single Button: Wattstopper LMSW-101
 - 2. Dual Buttons: Wattstopper LMSW-102
 - 3. Three Buttons: Wattstopper LMSW-103
 - 4. Four Buttons: Wattstopper LMSW-104
 - 5. Eight Buttons: Wattstopper LMSW-108
 - P. DIMMER LIGHT SWITCH: Wattstopper LMDM-101 or equal.
 - Q. LOW VOLTAGE MOMENTARY CONTACT KEY SWITCH: Wattstopper LVS-1K-G or equal. Provide key supplied with each switch. Note: Key must match existing Key in existing school district or campus. Coordinate with Owner for key type and acceptable manufacturer of key switch prior to ordering.
 - R. DIGITAL INPUT/OUTPUT INTERFACE: Wattstopper LMIO-101 or equal.
 - S. ACCESSORIES: Provide power packs for ceiling mounted units including multiple switching capabilities, wire guards where noted and hard ceiling adapters as necessary. Provide auxiliary dry contact (NO in lights off state), -RP option.
 - T. Spares: Include additional spare devices including installation, raceway and wiring where directed during construction. Items not installed shall become spares and be delivered to the Owner.
 - a. Room Controllers (3)
 - b. Occupancy Sensors (3 of each type)
 - c. Emergency Bypass Controllers (3)
 - d. Low Voltage Switches (3 of each type)
 - e. Daylight Harvesting Photocells
 - U. SUBMITTAL: Include equipment, wiring diagrams and installation floor plan.
- 2.02 Outdoor Lighting Control
- A. GENERAL: Outdoor lighting circuits shall be controlled by lighting contactors and BAS control points or photocells/time clocks. Lighting contactors shall be provided by Electrical Contractor. BAS lighting control points shall be provided by Mechanical Contractor. Photocells/Time clocks shall be provided by Electrical Contractor.

2.03 SUBMITTALS

- A. Submit manufacturer's data on lighting control system and components including shop drawings, detailed point to point wiring diagrams, and floor plans showing occupancy and daylighting sensor locations. Provide typical mounting details for occupancy and daylighting sensors for this application. Include equipment, wiring diagrams, programming and installation floor plan.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The installing electrical contractor shall complete, prior to request of Manufacturer factory start up and site commissioning, complete installation of all relay panels, their respective loads landed and confirmed operations, switches installed, and confirmed operational, and the entire data network shall be pulled from all panels to the designated IT room as indicated on plans.
- B. The installing contractor shall, prior to request of Manufacturer factory start up and site commissioning, request a site visit by the local authorized Manufacturer rep to assist in identification of any open ended issues, thereby eliminating potential for delays and system commission interruptions. The pre commissioning meeting shall include the local rep (Edwin Jones Co.), the Houston ISD project manager, the Houston ISD energy manager, the electrical contractor and the general contractor
- C. Upon confirmation of progress by local factory authorities, the installing electrical contractor will complete the start up request form found in the Manufacturer submittals, including any relay/circuit, and switching changes from the contract documents. This is essential to facilitate substantial completion.
- D. The installing electrical contractor shall clearly label all low voltage wiring inside the relay controllers. Labels shall be typed and indicate what they are connected to (switch, occupancy sensor, etc..) and what room they are connected to. Labels shall be Panduit Permanent Labels or Brother Cable Labels. The room # shall include both the architectural plan room numbers as well as the room numbers to be shown on the signage.
- E. All low voltage wiring inside the relay controllers must be clean and organized. Wire nuts are not acceptable, only compression fittings.
- F. Low voltage wire shall be terminated so the wire jackets match the color coding on the termination blocks.
- G. Attic stock. Electrical contractor shall provide the following spare parts package to turn over to the owner within thirty (30) days of substantial completion of the project. This material is to be ordered separately when commissioning is scheduled in order to ensure the longest warranty period possible.
 - a. Room Controllers (3 of each type)
 - b. Occupancy Sensors (3 of each type)
 - c. Emergency Bypass Controllers / Generator Transfer Devices - GTD (3)
 - d. Low Voltage Switches (3 of each type)
 - e. Daylight Harvesting Photocells (3)
 - f. Provide installation for the above items where directed during construction at no additional cost to Owner. Items not installed shall become spares and be delivered to maintenance department.

- H. Install Stand Alone Digital Lighting Controller in ceiling cavity above digital light switch.
- I. Low voltage RJ45 cabling installed from Digital Lighting Controller to sensor(s) and from sensor to sensor shall be supported every 4 feet at a minimum height of 3 feet (near deck when less than 3 feet) above grid/ceiling. Support system shall be ceiling wire attached to structure and clipped to ceiling support grid using Caddy drop wire securing clip #EC311. Cabling is to hang plumb to devices.
- J. Low voltage cables at exposed area or above sheet rock ceiling shall be installed in conduit.
- K. Provide ceiling sensors rated for specified ceiling height as shown on Architectural Ceiling Plan. See Architectural Ceiling Plan for specified ceiling height.
- L. Provide wire guard for occupancy sensor in areas subject to physical damage.
- M. Occupancy sensor feature, setting and control sequence must comply with latest IECC code and City requirement.
- O. Occupancy Sensors shall have dual technology infrared and ultrasonic detection system. Unit shall have field adjustable time delay and sensitivity adjustment.
- P. Location of all sensors is approximate. Review installation instructions before installing sensors.
- Q. To prevent false activation, Ultrasonic ceiling mount sensors should be mounted away from the path of strong air turbulence. In normal airflow conditions sensors should be mounted four to six feet away from source. For typical placement, ref to location diagrams. In locations with strong air turbulence a PIR ceiling sensor should be considered.
- R. Contractor should follow manufacturer's recommended placement and verify circuits with respect to digital lighting controller and power pack needed in the field.
- S. Adjust sensor to de-energize lighting after 30 minutes of inactivity.

3.02 SUPPORT SERVICES

- 1) System Start Up and Commissioning
 - a) Manufacturer shall provide a factory authorized technician to confirm proper installation and operation of all lighting control system components. The startup requirement is intended to verify:
 - i) That all occupancy and daylighting sensors are located, installed, and adjusted as intended by the factory and the contract documents.
 - ii) The occupancy sensors and daylighting sensors are operating within the manufacturers specifications.
 - iii) The sensors and room controllers interact as a complete and operational system to meet the design intent.
 - b) Manufacturer to provide a written statement verifying that the system meets the above requirements.
- 2) System Training

- a) Manufacturer shall provide factory authorized technician to train owner personnel in the operation, programming and maintenance of the lighting control system including all occupancy sensors and daylighting controls.
- 3) System Programming
 - a) Manufacturer shall provide system programming including:
 - i) Wiring documentation.
 - ii) Switch operation.
 - iii) Occupancy sensors.
 - iv) Photocells
 - b) Provide computer generated documentation on the commissioning of the system including a room by room description of:
 - i) Sensor Parameters, time delays, sensitivities and daylighting setpoints.
 - ii) Sequence of operation (e.g. manual on, auto off, etc.)
 - iii) Load Parameters (e.g. blink warning, etc.)
- 4) Re-Commissioning
 - a) After 90 days from occupancy the factory authorized representative and electrical contractor shall re-calibrate all sensor time delays and sensitivities to meet the Owner's Project Requirements. Provide a detailed report to the Architect/Owner of all re-commissioning activity and changes.
- 5) Warranty
 - a) Provide a five (5) year complete manufacturer's warranty on all products to be free of manufacturers' defects.
 - b) System warranty shall be for one (1) year of complete maintenance coverage after final acceptance of the system and include all material and labor to provide consistent peak performance of the system. Post-warranty maintenance shall be available on contract or call basis.

END OF SECTION

SECTION 26 10 00 - AUXILIARY SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 - SYSTEMS

2.01 GENERAL: See Electrical Site Plan, Electrical Floor Plan and Technology Consultant's Site Plans and Floor Plans for additional auxiliary system devices not shown on electrical Drawings. General Contractor shall coordinate with Electrical Contractor and Low Voltage Subcontractors that all conduits, cable trays, J-boxes, sleeves and 120V circuit under all sections in [Divisions 26, 27 & 28](#) shall be provided and installed by Electrical Contractor under the base proposal pricing – No exception. All low voltage cable must be installed in conduit except the plenum rated low voltage above the accessible lay-in ceiling may be supported by cable trays 18" above the ceiling without conduit.

2.02 FIRE ALARM SYSTEMS

For Fire Alarm Devices shown, provide J-box and 3/4" conduit to accessible ceiling. Also, coordinate with fire alarm system supplier to provide conduits, 120V emergency power circuits and Data / Telephone Jacks at the Fire Alarm Control Panel and 120V emergency power circuits at Remote Power Supply locations.

2.03 INTERCOM COMMUNICATION SYSTEM & LOCAL SOUND SYSTEM

For intercom and sound system outlets, volume controls and speaker shown, provide J-box and 3/4" conduit to accessible ceiling. For floor outlets, provide 1.25" conduit to accessible ceiling. Also, coordinate with intercom and sound system supplier to provide conduits, 120V emergency power circuits and Data / Telephone Jacks at the Intercom and Sound System Cabinet locations.

2.04 VIDEO & AUDIO SYSTEM

For video & audio outlets shown, provide J-box and 1.25" conduit to accessible ceiling. For floor outlets, provide 1.25" conduit to accessible ceiling. Also, coordinate with video and audio system supplier to provide 120V power circuits at video and audio HDBase device locations.

2.05 TELEPHONE AND DATA NETWORK CABLING

For data outlets shown, provide J-box and 1" conduit to accessible ceiling. For floor outlets, provide 1" conduit to accessible ceiling. Also, coordinate with Data Network Cabling system supplier to provide conduits, 120V emergency power circuits at the Data System Rack locations.

2.06 SECURITY SYSTEMS

For Security, Access Control and Camera Devices shown, provide J-box and 3/4" conduit to accessible ceiling. Also, coordinate with security system supplier provide conduits, 120V power circuits and Data / Telephone Jacks at the Security, Access Control and CCTV System Cabinet / Rack locations.

2.07 SHEET ROCK, PLASTER or OTHER HARD CEILING

Provide conduits for all low voltage cables above sheet rock, plaster or other hard ceiling. Provide and install recessed access panels/doors as necessary. Coordinate with GC and Low Voltage Sub-Contractor for required drywall ceiling access panels/door locations during bidding period. Notes: Drywall ceiling access panels and conduits are not shown on the plans.

2.08 CEILING TILE MOUNT DEVICES

Provide ceiling tile bridge box slider as necessary to mount devices on ceiling tiles.

2.09 EXPOSED CEILING

Provide conduits for all low voltage cables in area with exposed ceiling or cloud ceiling.

2.10 WALL PENETRATION SLEEVES

For area with wall above ceiling or walls up to structural, provide wall penetration conduit sleeves with protective bushings to allow low voltage cables to be run thru walls. Minimum size of wall sleeves shall be 1" C. Note: Wall sleeves are not shown on the plans.

END OF SECTION

SECTION 26 27 26 – WIRING DEVICES AND MISC. ELECTRICAL EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 - MATERIALS AND METHODS

2.01 WIRING DEVICES

- A. GENERAL: All devices must be suitable for use intended, and have voltage and current ratings adequate for loads served. All devices shall have terminals designed for use with stranded wire. All receptacles shall have a grounded pole and green painted grounding screw. Grounded receptacles shall ground lug internally connected to mounting tabs. Wall outlets shall be installed with the ground pin down. Devices installed in or served through fire rated structures shall be fireproofed in a manner compatible with the U. L. fire rating.
- B. ACCEPTABLE MANUFACTURERS: Catalog numbers listed below are Hubbell, unless indicated otherwise. Equivalent items made by P&S will be acceptable provided they meet specification requirements.
Note: Verify with Architect and Owner for desired color prior to ordering wiring devices.
- C. WALL SWITCHES: (20 Amp/277 Volt) HBL1221-White
- D. KEYED SWITCHES: (20 Amp/277 Volt) HBL1121L-White
Note: Key must match existing campus keyed switches. Deliver all “keys” to Architect.
- E. LOW VOLTAGE LIGHTING CONTROL BUTTONS: See Lighting Control Specification.
- F. CONVENIENCE OUTLETS: (20 amp/125v/3 wire) HBL5362WTR. (Red if on generator):
Extra Heavy Duty, Tamper-Resistant, One-piece nickel-plated brass ground strap, oversized “bell” shaped ground contacts, along with nickel plated steel retaining shields.
- G. GFI OUTLETS: (20 amp/125v/3 wire) :
GFR8300SGI (Extra Heavy Duty, Tamper-Resistant & White color), 10KA short circuit rating, nickel-plated brass ground strap, Green LED power indication, Red LED ground fault indicator, no power at face if reverse wired.
- H. ISOLATED GROUND COMPUTER OUTLETS IN IDF/MDF ROOMS: (20 amp/125v/3 wire)
IG8300 (Extra Heavy Duty, Tamper-Resistant & Orange color).
- I. SPECIAL DEVICES: Refer to Drawings, all specification grade. Provide matching cord and cap.
- J. PLATES: Provide Type 302/304 smooth stainless steel plates for all devices; provide combination and/or gangable plates where adjacently located multi-outlet assemblies are indicated on drawings which shall include multi-switch installations. Plates for surface mounted switch or outlet boxes shall be Sierra galvanized steel handy box plates (H series). Mounting screws shall be stainless steel. Jumbo plates are not acceptable.

- K. **OUTDOOR COVERS:** Electrical devices noted "WP" installed under canopies or other areas not subject to direct rainfall shall have aluminum self closing covers that are rated for wet location with cover closed. Devices subject to direct rainfall shall have Hubbell WP26M aluminum cover rated for wet location with cord connected to device.
- L. **FLOOR OUTLETS:**
1. Provide Legrand Wiremold Evolution Series Floor Boxes: Minimum 4 gangs of capacity, see plan for additional gangs required. Auto-close egress doors, accepts standard size wall plates, die cast aluminum cover assemblies, finished interior. Legrand 1 Box or EFB Series. Above grade concrete floor boxes shall have fire classification of the floor, Legrand EFB*S-FC Series. Color to be selected by Architect. Gym Floor Box must rated for vandalproof and extreme heavy duty.
 2. All on-grade floor boxes: Provide matching conduit access holes to accommodate power/AV/data devices and cabling shown on the plans. Also, provide on-grade barrier installed prior to the concrete pour in order to provide a barrier between the soil. The on-grade barrier comes with leveling feet and anchor points.
 3. All fire-rated above grade floor boxes: Provide U.L. fire classified floor boxes rated for floor structures. Provide matching fittings and accessories such as power junction boxes and low voltage cabling replacement fitting boxes and conduits to accommodate power/AV/data devices and cabling shown on the plans.
 4. All floor boxes, Provide matching cast metallic Flage and cover assembly for carpet, tile or other floor material. Finishes and colors available for Architect to select: Aluminum, Brass, Black, Gray and Ivory.
 5. All floor boxes: Provide matching Sub-Plates, sub-plate accessories and wiring devices to match power/AV/data devices shown on the plans.
- M **DIMMERS:** 120/277V, 20A, with dimming controller and on/off switch. Select dimmer for 150% of load served, 2000 watt maximum. White finish. Provide stainless face plate. Provide matching three way remote preset where shown. Note: For room with occupancy sensor, provide matching digital dimmer switch to match the dimmable digital lighting controller.
- N. **Recessed TV Box:** For outlets to serve TV, Contractor shall provide recessed type metal TV Box with recessed device plate and connectors to recess the TV plug and Data plug into the wall, acceptable manufacturer shall be Hubbell, P&S and approved equal.
- O. Provide circuit identification on all electrical wiring devices. Provide circuit label on the front of the device plate. Mark electrical circuit number on the back of faceplate and also mark the electrical circuit number inside the device junction boxes of the devices.

2.03 TIME CLOCKS

7-Day Electronic Astronomic Time Clock.

1. Provide Intermatic Model ET8215C Series with two (2) 20A contacts to serve exterior lighting fixtures for project with lighting controlled by Time Clock. Note: For project with lighting controlled by BAS, time clock is not required. See plan for additional information.
2. Provide the Intermatic Model ET8000 Series time clock(s) for all 120V, 20A plumbing hot water heater circulation pump circuit(s) as shown on the electrical floor plans, typical of all.
3. Contractor shall program time clock per Owner's schedule.
4. Provide additional set of batteries for maintenance.
5. See Drawings for additional information.

END OF SECTION

SECTION 26 32 13 – NATURAL GAS STANDBY GENERATOR SETS AND TRANSFER SWITCHES

1.1 QUALITY ASSURANCE

A. Acceptable Manufacturers:

Onan/Cummins/Southern Plains Power, Kohler or Caterpillar.

1.2 NATURAL GAS STANDBY GENERATOR SETS AND TRANSFER SWITCHES

A. Provide two natural gas standby generator sets and two transfer switches. One generator set and transfer switch are for existing administration building. Another generator set and transfer switch are for the new buildings.

B. GENERATORS:

1. GENERAL: Provide standby natural gas fired generators suitable for outdoor installation with remote mounted panel and transfer switch. Refer to drawings for size & KW rating required.
2. ENGINE: Four cycle gas engine, complete with electronic governor for tight frequency control and starter.
3. ALTERNATOR: Revolving field, three pole brushless type with epoxy impregnated windings rated set for 480Y/277 volts, 3 phase, 4 wire. Provide non-transferable neutral.
4. ACCESSORIES:
 - a. Weatherproof housing with residential muffler and rain cap for outside installation
 - b. Provide two remote digital display / remote annunciators to monitor load power conditions, adjusting transfer switch parameters, monitoring network status and reviewing transfer switch events. Monitor shall be password protected to limit access to adjustments and key lock protected to prevent unauthorized activation of transfer or test functions. One installed adjacent to the ATS; another installed at administration area at location desired by the Owner.
 - c. 125 watt, 120 volt heater in alternator to compensate for condensation
 - d. Starter batteries.
 - e. Engine coolant heater, 1500 watt at 120 volts.
 - f. Voltage sensing dry contact to verify AC power generation. Provide two dry auxiliary contacts one for common alarm and one for engine running to be monitored by the BAS.
 - g. AC output line circuit breaker(s), 100% rated. Re: Electrical One Line Diagram for rating.
 - h. 10 amp, 24 volt battery charger (Model 305-0813-01).
 - i. Complete oil and coolant charge (with anti-freeze to 0° F).
 - j. Gas pressure reducing valve and flexible hose with stainless steel wire braid covering for natural gas connection.
 - k. Cables between unit, batteries, charger, controller, remote annunciator and transfer switch.

C. AUTOMATIC TRANSFER SWITCHES:

1. Onan OTPC Series or equal by acceptable manufacturer listed.
2. Provide transfer switches installed in NEMA 1 cabinets. Refer to drawings for size required. Provide a remote digital display.
3. RATINGS: 480 volts, 3 phase, 4 wire. Provide three-pole switch (with non-transferable neutral). Provide switching sequence compatible with Houston Lighting and Power Company requirements. Unit shall have a long-time/closing rating of 65,000 AIC.
4. Extended start time delay (0 to 90 seconds).
5. Seven day exerciser clock.
6. Programmed transition (0 to 60 seconds).
7. 24 volt coil auxiliary relay with 2-NO and 2-NC dry contacts.

8. ATS shall have communications that support BAS and other systems. Tie to BAS and other systems
9. Voltage, Amp and Frequency meters with phase selector switch.

D. DOCKING STATION

1. Provide a Trystar dual purpose Generator docking station outdoor near the generator. The docking station permits the connection of both a portable generator and a permanent generator to serve a permanently connected load. It also allows the permanent generator to be load banked. Provide kirk key interlock system between permanent source breaker and portable generator access door.
2. Provide control system and cables between generator and docking station.

E. MISC. REQUIREMENTS:

1. TESTING: Provide 8 hour load test and run-in with full load at the local distributor's facility prior to shipment. After installation provide complete startup and checkout of generator and transfer switch.
2. DRAWINGS: Provide five sets of service/operation manuals and one set of drawings for the standby generator and transfer switch system and equipment.
3. WARRANTY: Provide 5 year or 1500 hour operation, non-prorated, parts and labor warranty for the generator and automatic transfer switch.
4. SERVICE CONTRACT: Provide 1 year service contract that includes monthly visits to observe and record condition, and verify generator "exercise" programming is operational. Generator exercise schedule shall be coordinated with school district for day and time. Initially set for Tuesdays at 8 AM without load transfer.
5. TRAINING: Provide four hours training on operation and maintenance of the generator and transfer switch for four persons at the school site.
6. IDENTIFICATIONS OF EQUIPMENT: Factory Nameplate, Field Nameplate, Caution Nameplate and Additional identifications of Equipment: See Specification 26 05 00 Electrical General Provisions.

1.4 INSTALLATION

- A. Installation shall comply with manufacturer's requirements and installation details on the Drawings.
- B. Vibration Isolation: Ribbed Neoprene Vibration Isolation
- C. Concrete Pad: Install generator set on a reinforced concrete pad. The generator pad shall extend 6" beyond the generator set base, unless shown otherwise. Furnish the exact position of any block outs, mounting bolts, and the dimensions and location of the generator pad in a timely manner so as to prevent delay of the concrete work. Refer to Section 26 00 00 for housekeeping pads and Division 3 for Concrete Work. Provide the same concrete pad as concrete pad for Center Point Energy power company pad mounted transformer standard.
- D. Grounding: Install the generator as a separately derived system. Ground the generator neutral to the generator frame. Ground the generator frame to the building grounding system and provide a driven ground electrode at the generator location.
- E. SYSTEM SETUP: Contractor shall provide system setup and programming for the emergency generator and automatic transfer switches. The emergency automatic transfer switch serving the required lighting and other emergency loads shall be set to start the generator and then transfer the load to the generator with a 1-2 second time delay. Once utility power is restored, the ATS shall switch loads back to the utility after five minutes. Program the existing automatic transfer switch to transfer from normal power to emergency power when there is only one or more phase loss normal power. Program the existing automatic transfer switch to break the normal power connection before close the emergency power connection.

- F. FINAL APPROVAL: The final approval test of the new and existing generator system shall consist of opening the building main circuit breaker. Generator shall start and automatically power the electrically load connected to the associated electrical panels. All emergency lights shall illuminate. After operation of emergency loads are verified, main circuit breaker will be closed. Generator system shall wait the prescribed time then automatically transfer these loads back to the utility service. All lights that were ON prior to opening main circuit breaker shall come back ON automatically. Generator shall wait the prescribed time then shut off. Test shall be performed by the factory authorized representative and witness by Project Engineer and school personnel.

END OF SECTION

SECTION 26 50 00 – LIGHT FIXTURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 - MATERIALS AND METHODS

2.01 LIGHT FIXTURES

- A. GENERAL: Provide all fixtures as shown, completely wired and securely attached to supports. Include all necessary accessories including heavy duty, chrome plated wire guards on high bay and indirect and over exit lights located in the gymnasium. Provide wire guards for 1x4 strip light fixtures in electrical and mechanical rooms. Fixture models scheduled are to show general type of fixtures required. Furnish mounting design and trim to fit type of ceiling and finish on which fixture is to be installed. Fixture shall be designed to operate satisfactorily where installed including the required fire proofing. All fixtures are static unless noted to be otherwise on the fixture schedule. All lens and doors shall be securely attached to the housing with spring operated latches to prevent release due to vibration or gravity.
- B. PAINT: All light fixture housings shall have a complete coverage of white alkyd reflecting enamel, 85% minimum reflectivity, applied after fabrication then baked in a temperature controlled oven until paint is thoroughly cured. Prior to applying the enamel, each metallic surface shall be prepared for painting by using a five stage hot zinc phosphatizing process. Baked polyester powder finish is acceptable.
- C. PLASTIC REFRACTORS/DIFFUSERS: Material shall be light-stable 100% virgin acrylic, translucent (98% minimum transmission), conforming to minimum standards of IES-NEMA-SPI. Material shall perform as applied in a normal interior environment for a period of 20 years, without noticeable deformation and with a transmission loss not exceeding 5%. Nominal thickness of material shall be .125" for either extrusions or injections.
- D. LAMPS and LIGHT FIXTURES: Provide all lamps as scheduled. Provide all LED light fixtures. All LED fixtures shall be qualified under ENERGY STAR or Design Lights Consortium programs. Provide 5 year manufacturer's warranty for all LED light fixtures. LED light fixtures shall have 0-10v Dimming Driver, True 120-277V (Not 240V), IP41 Minimum, Variable dimming, 100 lumens per watt, 4000K color temperature.
- E. BALLASTS AND DRIVERS: LED Driver shall have 0-10v Dimming, True 120-277V (Not 240V). All ballasts and drivers shall be electronic type with a maximum of 10% THD, a minimum ballast factor of 0.90, a minimum power factor of .99 and crest factor less than 1.6. Ballasts shall have lamps wired in parallel so failure of one lamp does not extinguish all lamps or degrade ballast performance. Provide single lamp ballasts and drivers where one lamp of the fixture is shown to be connected to a remote emergency power source. Ballasts installed in suspended light fixtures shall be specifically selected and installed in a manner so as to emit no discernible buzzing or hum. Ballasts installed in fixtures mounted in U. L. fire rated ceilings or ceilings with insulation on top shall be of low heat type to allow operation under these conditions. Ballasts shall be suitable for use with occupancy sensors that will cause a higher rate of switching. Ballasts for outdoor fixtures or unheated areas shall be rated for 0° operation. Ballasts and drivers shall be warranted for five years from date of substantial completion of the project. All ballasts and drivers shall be certified as CEE-Qualifying High Performance Ballasts. Ballasts shall be manufactured by Advance, Motorola or Magnetek. Provide 5 year manufacturer's warranty for all ballasts and drivers.

- F. **EMERGENCY POWER PACKS:** High output, self-contained, unit mounted internal to fixture to power two lamps. Battery shall be long life nickel cadmium sized for 90 minute operation. Unit shall have 120/277 volt solid state charger and automatic transfer switch. Unit shall provide a nominal 1100 lumen output from the specified fluorescent lamps. Provide and install indicator light and test button. For light fixtures require remotely mounted battery packs, provide required power packs installed at readily accessible location and provide proper wire size per manufacturer's instruction. Emergi-lite Model FPSI/U or latest part numbers. LED light fixture battery pack must be manufactured by Philips.
- G. **FIRE PROTECTION:** Provide fixture fire protection as required by U. L. Fire Resistive Index for the type ceiling to be installed. Provide additional fireproofing as required by the local building code. Protection is specified under the Ceiling Section of these Specifications.
- H. **SUPPORT:** Adequate, sturdy support as necessary to prevent possibility of fixture falling. Layin fixtures shall be supported with wire hangers at all four corners. Surface and pendant fluorescent fixtures must be supported with two supports per four foot section. All pendants must have swivel aligners located at the top ends; pendants shall be 1/2" rigid steel conduit, unless specifically indicated otherwise on drawings, painted as directed by Architect on jobsite. Support surface mounted fluorescent fixtures from structural members other than ceiling tees by providing Unistrut members laid across main ceiling tees or by attachment directly to structure. Provide caddy clips for recessed fixtures. Pendants for indirect light fixtures shall be securely attached to structure or Unistruts across joists using threaded connections. High bay fixtures and all light fixtures mounted higher than 14FT shall have manufacturer supplied quick disconnect mounting hardware and safety cable.
- I. **LIGHT POLES:** All poles shall be selected to support the scheduled fixtures and equipment for 130 MPH wind loading plus 1.3 gust factor. All poles shall be round aluminum tapered pole. Provide a reinforced concrete support base 24" in diameter by 72" in ground with 30" above grade. For poles taller than 40 feet, Contractor shall have light fixture manufacturer to hire a professional engineer to provide the Structural Design Calculations and Drawings for light pole and light pole base.
- J. **INTERIOR PHOTOMETRIC:** Lumens output shown on the light fixture schedule is only the minimum lumens output. Contractor shall submit floor plans with all interior light fixtures. Contractor shall provide photometric calculations and increase light fixture lumens level as required to meet the light level table below.

Light Level Table:

<u>Room Type</u>	<u>Average maintained light level in foot candles at work surface.</u>
Classrooms	50 FC minimum
Any Instructional Space	50 FC minimum
Office and Workrooms	50 FC minimum
Computer Labs	50 FC minimum
Kitchen	50 FC minimum
Gym	75 FC minimum
Science Labs	60 FC minimum
Auditorium and Stage	50 FC minimum
Student Dining / Commons	50 FC minimum
Mechanical Rooms	50 FC minimum
Corridors	30 FC minimum
Restrooms	30 FC minimum
Lockers / Storages	30 FC minimum

- K. **EXTERIOR PHOTOMETRIC:** Submit site plan with all exterior light fixtures mounted on the building, at the parking lots and other exterior area. Provide photometric calculations and adjust light fixture distribution optic and lumens output as required. Lighting level at the project property lines must comply with latest version of LEED green building requirement in order to prevent lighting pollution outside the school property lines. Contractor shall provide photometric floor plan layout in AutoCad Drawings during submittal and construction period to determine optimal mounted height of light fixtures. Provide average 3-5 maintained light level with max to min ration of 10 to 1.

- L. Spares: Include additional spare devices including installation, raceway and wiring where directed during construction. Items not installed shall become spares and be delivered to the Owner.
 - a. LED Driver (3 of each type)
 - b. Lamps (3 of each type)

END OF SECTION