PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

000115 ............ LIST OF DRAWINGS
001116 ............ INVITATION TO BID
002113 ............ INSTRUCTIONS TO BIDDERS
002213.23 .......... SUPPLEMENTARY INSTRUCTIONS TO BIDDERS
002213.26 .......... SUBCONTRACTOR MULTI-SITE BIDDING FORM
003126 .......... HAZARDOUS MATERIALS DATA
003860 .......... DISQUALIFIED CONTRACTORS AND SUBCONTRACTORS
004113 .......... BID FORM
005201 .......... AGREEMENT FORMS
005213 .......... STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR
005433 .......... AUTHORIZATION AGREEMENT FOR AUTOMATIC DEPOSITS (ACH CREDITS) FORM
005435 .......... SUBSTITUTE W-9 FORM – REQUEST FOR TAXPAYER IDENTIFICATION NUMBER AND CERTIFICATION
005443 .......... RETAINAGE ESCROW INITIATION
006113 .......... CONTRACT BOND
006501 .......... NON-USE OF ASBESTOS CONTAINING MATERIALS AFFIDAVIT - CONTRACTOR
007213 .......... GENERAL CONDITIONS FOR THE CONTRACT FOR CONSTRUCTION (AIA A201 1997 – RPA STD 2009)
007340 .......... SUPPLEMENTARY CONDITIONS

SPECIFICATIONS GROUP

General Requirements Subgroup

DIVISION 01 - GENERAL REQUIREMENTS

011000 .......... GENERAL INFORMATION PERTAINING TO THE WORK
012219 .......... UNIT PRICES
012600 .......... MODIFICATION PROCEDURES
012620 .......... WEATHER DELAYS
012640 .......... FORM FOR AMENDMENT, CHANGE ORDER, OR DIRECTIVE
012650 .......... FORM FOR CONTRACTOR'S OR SUBCONTRACTOR'S COST ITEMIZATION
012973 .......... SCHEDULE OF VALUES
012976 .......... PAYMENT PROCEDURES
012976.13 .......... PERSONNEL USED IN CONTRACT PERFORMANCE
013000 .......... ADMINISTRATIVE REQUIREMENTS
013119 .......... PROJECT MEETINGS
013190 .......... ADMINISTRATIVE LOGS
013215 .......... PROGRESS SCHEDULES AND REPORTS
013324 .......... STRUCTURAL SUBMITTALS
014000 .......... QUALITY REQUIREMENTS
014115 .......... REGULATORY REQUIREMENTS
014325 .......... TESTING LABORATORY SERVICES
015000 .......... TEMPORARY FACILITIES AND CONTROLS
016000 .......... PRODUCT REQUIREMENTS
016225 .......... PRODUCT OPTIONS AND SUBSTITUTIONS
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>016232</td>
<td>SUBSTITUTION REQUEST FORM</td>
</tr>
<tr>
<td>017000</td>
<td>EXECUTION REQUIREMENTS</td>
</tr>
<tr>
<td>017770</td>
<td>CONTRACT CLOSEOUT</td>
</tr>
<tr>
<td>017821</td>
<td>CLOSEOUT SUBMITTALS</td>
</tr>
<tr>
<td>017888</td>
<td>REPORT OF SUBCONTRACTORS AND SUPPLIANS</td>
</tr>
<tr>
<td>017900</td>
<td>DEMONSTRATION AND TRAINING</td>
</tr>
</tbody>
</table>

**Facility Construction Subgroup**

**DIVISION 02 - EXISTING CONDITIONS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>024119</td>
<td>DEMOLITION FOR RENOVATION WORK</td>
</tr>
</tbody>
</table>

**DIVISIONS 03 and 04 – NOT USED**

**DIVISION 05 - METALS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>051200</td>
<td>STRUCTURAL STEEL FRAMING</td>
</tr>
<tr>
<td>055000</td>
<td>METAL FABRICATIONS</td>
</tr>
<tr>
<td>055213</td>
<td>PIPE AND TUBE RAILINGS</td>
</tr>
<tr>
<td>055306</td>
<td>STEEL GRATINGS</td>
</tr>
</tbody>
</table>

**DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>061000</td>
<td>ROUGH CARPENTRY</td>
</tr>
</tbody>
</table>

**DIVISION 07 - THERMAL AND MOISTURE PROTECTION**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>071300</td>
<td>SHEET WATERPROOFING</td>
</tr>
<tr>
<td>075190</td>
<td>PATCHING EXISTING ROOFING</td>
</tr>
<tr>
<td>076200</td>
<td>SHEET METAL FLASHING</td>
</tr>
<tr>
<td>078400</td>
<td>FIRESTOPPING</td>
</tr>
<tr>
<td>079005</td>
<td>JOINT SEALERS</td>
</tr>
</tbody>
</table>

**DIVISION 08 - OPENINGS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>081113</td>
<td>HOLLOW METAL DOORS AND FRAMES</td>
</tr>
<tr>
<td>081423</td>
<td>LAMINATED PLASTIC FACED WOOD DOORS</td>
</tr>
<tr>
<td>087100</td>
<td>DOOR HARDWARE</td>
</tr>
<tr>
<td>089100</td>
<td>LOUVERS</td>
</tr>
</tbody>
</table>

**DIVISION 09 - FINISHES**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>092116</td>
<td>GYPSUM BOARD ASSEMBLIES</td>
</tr>
<tr>
<td>096500</td>
<td>RESILIENT FLOORING</td>
</tr>
<tr>
<td>099000</td>
<td>PAINTING AND COATING</td>
</tr>
</tbody>
</table>

**DIVISION 10 - SPECIALTIES**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>101400</td>
<td>SIGNAGE</td>
</tr>
<tr>
<td>102601</td>
<td>ELEVATOR CAB WALL PROTECTION</td>
</tr>
</tbody>
</table>

**DIVISIONS 11 thru 13 – NOT USED**
DIVISION 14 - CONVEYING EQUIPMENT

142100 ............. ELEVATOR MODIFICATIONS – TENNESSEE TOWER
142120 ............. ELEVATOR MODIFICATIONS - ANDREW JACKSON
142140 ............. ELEVATOR MODIFICATIONS - RACHEL JACKSON
142250 ............. HYDRAULIC PASSENGER ELEVATOR MODIFICATIONS – WTRHC
142280 ............. HYDRAULIC FREIGHT ELEVATOR MODIFICATIONS – TENNESSEE TOWER
145000 ............. SCISSOR DOCK LIFT – TENNESSEE TOWER

DIVISIONS 15 thru 20 – NOT USED

Facility Services Subgroup

DIVISIONS 21 and 22 – NOT USED

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING

230500 ............. Common Work Results for HVAC
230513 ............. Motors for HVAC
230523 ............. General-Duty Valves for HVAC
230529 ............. Pipe Hangers
230548 ............. Vibration Isolation
230553 ............. Identification for HVAC Piping and Equipment
230593 ............. HVAC Systems Test and Balance
230700 ............. HVAC Insulation
230750 ............. Fire Rated Duct Insulation
230913 ............. Instrumentation and Control Devices
232113 ............. HVAC Piping
232300 ............. Refrigeration Piping System
233113 ............. Sheetmetal Ductwork
233300 ............. Air Duct Accessories
236213 ............. Packaged Air-Cooled Refrigerant Compressor and Condenser Unit
236313 ............. Air Cooled Condensing Units
238126 ............. Split System A/C Units
238218 ............. Blower Coil Units

DIVISIONS 24 and 25 – NOT USED

DIVISION 26 - ELECTRICAL

260500 ............. Common Work Results for Electrical
260519 ............. Low Voltage Electrical Power Conductors
260526 ............. Grounding and Bonding for Electrical Systems
260529 ............. Hangers and Supports for Electrical Systems
260533 ............. Raceways and Conduit Systems
260534 ............. Pull and Junction Boxes
260535 ............. Outlet Boxes
260553 ............. Identification for Electrical Systems
262416 ............. Panelboards
262726 ............. Wiring Devices
262727 ............. Wiring Device Plates
262816 ............. Enclosed Switches
262913 ............. Motor Starters
263600 ............. Transfer Switches
DIVISION 27 – NOT USED

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

280500 .............. Common Work Results for Electronic Safety and Security

END OF TABLE OF CONTENTS
WILLIAM SNODGRASS TENNESSEE TOWER

COVER SHEET
TT-A0.00....... INDEX, GENERAL NOTES AND LEGENDS
TT-ADA1.01 .... ADA DETAILS
TT-D1.01....... DEMOLITION PLANS – 2ND FLOOR
TT-D1.02....... DEMOLITION PLANS – 3RD FLOOR
TT-D1.03....... DEMOLITION PLANS – 4TH & 5TH FLOOR
TT-D1.04....... DEMOLITION PLANS – 6TH & 17TH FLOOR
TT-D1.05....... DEMOLITION PLANS – 18TH & 19TH FLOOR
TT-D1.06....... DEMOLITION PLANS – 25TH & 27TH FLOOR
TT-D1.07....... DEMOLITION PLANS – 28TH FLOOR
TT-D1.08....... DEMOLITION PLANS – 29TH FLOOR
TT-D1.09....... DEMOLITION PLANS – 29TH/30TH INTERMEDIATE FLOOR
TT-D1.10....... DEMOLITION PLANS – 30TH & 31ST FLOOR/ROOF
TT-A1.01....... NOTED PLANS – 1ST FLOOR
TT-A1.02....... NOTED PLANS – 2ND FLOOR
TT-A1.03....... NOTED PLANS – 3RD FLOOR
TT-A1.04....... NOTED PLANS – 4TH & 5TH FLOOR
TT-A1.05....... NOTED PLANS – 6TH & 17TH FLOOR
TT-A1.06....... NOTED PLANS – 18TH & 19TH FLOOR
TT-A1.07....... NOTED PLANS – 25TH & 27TH FLOOR
TT-A1.08....... NOTED PLANS – 28TH FLOOR
TT-A1.09....... NOTED PLANS – 29TH FLOOR
TT-A1.10....... NOTED PLANS – 29TH/30TH INTERMEDIATE FLOOR
TT-A1.11....... NOTED PLANS – 30TH, ELEV. #1 MACHINE RM., & 31ST FLOOR/ROOF
TT-A3.31....... ELEVATOR SECTIONS
TT-A6.01....... DOOR SCHEDULE AND DETAILS
TT-F1.01....... FINISH PLANS
TT-S1.20....... STRUCTURAL NOTES, QUALITY ASSURANCE PLAN, EXISTING FRAMING PLANS FOR 30TH AND 31ST FLOOR
TT-S2.01....... SECTIONS AND DETAILS
TT-M0.00....... HVAC SCHEDULES & CONTROLS
TT-M1.078..... HVAC PLAN - 19TH FLOOR
TT-M1.088..... HVAC PLAN - 25TH FLOOR
TT-M1.108..... HVAC PLAN - 29TH & 29/30TH INTERMEDIATE FLOOR
TT-M1.118..... HVAC PLAN - 30TH & 31ST FLOOR
TT-M4.01....... HVAC DETAILS
TT-E0.1....... ELECTRICAL LEGEND, SCHEDULES, & NOTES
TT-E0.2....... ELECTRICAL DETAILS
TT-ED1.02..... ELECTRICAL DEMOLITION 2ND FLOOR LOWER LEVEL PLANS
TT-ED1.06..... ELECTRICAL DEMOLITION 17TH & 18TH FLOOR PLANS
TT-ED1.07..... ELECTRICAL DEMOLITION 19TH & 20TH FLOOR PLANS
TT-ED1.08..... ELECTRICAL DEMOLITION 25TH & 26TH FLOOR PLANS
TT-ED1.10..... ELECTRICAL DEMOLITION 29TH & 29TH/30TH INTERMEDIATE PLANS
TT-EL1.06B.... 18TH FLOOR & 19TH FLOOR LIGHTING PLAN
TT-EL1.10B.... 29TH FLOOR & 29TH/30TH INTERMEDIATE FLOOR LIGHTING PLAN
TT-EP1.01B .... 1ST FLOOR LOWER LEVEL POWER PLAN
TT-EP1.02B .... 2ND FLOOR LOWER LEVEL POWER PLAN
TT-EP1.06B .... 17TH & 18TH FLOOR POWER PLAN
TT-EP1.07B .... 19TH & 20TH FLOOR POWER PLAN
TT-EP1.08B .... 25TH & 26TH FLOOR POWER PLAN
TT-EP1.10B .... 29TH & 29/30TH INTERMEDIATE FLOOR POWER PLAN
TT-EP1.11B .... POWER 30TH FLOOR & MACHINE RM. ELEVATOR NO. 1 PLAN
ANDREW JACKSON STATE BUILDING

COVER SHEET
AJ-A0.00 ....... INDEX, GENERAL NOTES AND LEGENDS
AJ-ADA1.01 .... ADA DETAILS
AJ-D1.01 ....... DEMOLITION PLANS – BASEMENT FLOOR
AJ-D1.02 ....... DEMOLITION PLANS – GROUND FLOOR
AJ-D1.03 ....... DEMOLITION PLANS – 1ST FLOOR
AJ-D1.04 ....... DEMOLITION PLANS – ELEVATOR MACHINE ROOM
AJ-D1.21 ....... DEMOLITION ROOF PLAN
AJ-A1.01 ....... NOTED PLANS – BASEMENT FLOOR
AJ-A1.02 ....... NOTED PLANS – GROUND FLOOR
AJ-A1.03 ....... NOTED PLANS – 1ST FLOOR
AJ-A1.04 ....... NOTED PLANS – ELEVATOR MACHINE ROOM
AJ-A1.21 ....... ROOF PLAN
AJ-A3.31 ....... ELEVATOR SECTIONS AND PARTITION DETAILS
AJ-S1.20 ....... STRUCTURAL NOTES, QUALITY ASSURANCE PLAN, EXISTING ELEVATOR MACHINE ROOM ROOF FRAMING PLAN
AJ-S2.01 ....... SECTIONS & DETAILS
AJ-M0.00 ....... HVAC SCHEDULES & CONTROLS
AJ-M1.04B .... HVAC FLOOR PLANS - DEMOLITION AND NEW WORK
AJ-M4.1 ....... HVAC DETAILS
AJ-E0.1 ......... ELECTRICAL LEGEND, SCHEDULES, NOTES
AJ-E0.2 ......... ELECTRICAL DETAILS
AJ-ED1.04 .... ELECTRICAL Demolition - ELEVATOR MACHINE ROOM PLAN
AJ-EP1.01B .... POWER - BASEMENT FLOOR PLAN
AJ-EP1.04B .... POWER - ELEVATOR MACHINE ROOM PLAN

RACHEL JACKSON STATE BUILDING

COVER SHEET
RJ-A0.00 ....... INDEX, GENERAL NOTES AND LEGENDS
RJ-ADA1.01 .... ADA DETAILS
RJ-D1.01 ....... DEMOLITION PLANS – 2ND & 3RD FLOOR
RJ-D1.02 ....... DEMOLITION PLANS – 4TH & 5TH FLOOR
RJ-D1.03 ....... DEMOLITION PLANS – 6TH & 7TH FLOOR
RJ-D1.04 ....... DEMOLITION PLANS – 8TH & 7MACHINE RM. FLOOR & ROOF
RJ-A1.01 ....... NOTED PLANS – SUB BASEMENT & BASEMENT FLOOR
RJ-A1.02 ....... NOTED PLANS – 1ST & 2ND FLOOR
RJ-A1.03 ....... NOTED PLANS – 3RD & 4TH FLOOR
RJ-A1.04 ....... NOTED PLANS – 5TH & 6TH FLOOR
RJ-A1.05 ....... NOTED PLANS – 7TH & 8TH FLOOR
RJ-A1.06 ....... NOTED PLANS – MACHINE RM. & ROOF PLAN
RJ-A3.31 ....... ELEVATOR SECTIONS
RJ-A6.01 ....... DOOR SCHEDULE AND DETAILS
RJ-F1.01 ....... FINISH PLANS
RJ-S1.20 ....... STRUCTURAL NOTES, QUALITY ASSURANCE PLAN, SECTIONS & DETAILS, EXISTING MACHINE ROOM ROOF FRAMING PLAN
RJ-S2.01 ....... SECTIONS & DETAILS
RJ-M0.00 ....... HVAC SCHEDULES & CONTROLS
RJ-M1.04B .... HVAC FLOOR PLANS - DEMOLITION & NEW WORK
RJ-M4.1 ....... HVAC DETAILS
RJ-E0.1 ......... ELECTRICAL LEGEND, SCHEDULE, & NOTES
RJ-E0.2 ......... ELECTRICAL DETAILS
RJ-ED1.04 .... ELECTRICAL Demolition - MACHINE ROOM FLOOR PLAN
RJ-EP1.01B .... ELECTRICAL - SUB-BASEMENT & BASEMENT FLOOR PLAN
RJ-EP1.03B .... ELECTRICAL - 3RD FLOOR & 5TH FLOOR PLAN
RJ-EP1.04B .... ELECTRICAL - MACHINE ROOM FLOOR PLAN

Statewide Elevator Modernization 000115-2 34010
WEST TENNESSEE REGIONAL PUBLIC HEALTH

COVER SHEET
WT-A0.00 ...... INDEX, GENERAL NOTES AND LEGENDS
WT-ADA1.01. ADA DETAILS
WT-D1.01 ...... DEMOLITION PLANS
WT-A1.01 ...... NOTED PLANS – PASSENGER ELEVATOR
WT-A1.02 ...... NOTED PLANS – FREIGHT ELEVATOR
WT-A3.31 ...... ELEVATOR SECTIONS
WT-A6.01 ...... DOOR SCHEDULE/DETAILS & PARTITION DETAILS
WT-F1.01 ...... FINISH PLANS
WT-M0.0 ...... HVAC SCHEDULES & CONTROLS
WT-M1.01B ... HVAC PLAN - 1ST FLOOR - ELEVATORS
WT-E0.1......... ELECTRICAL LEGEND, SCHEDULES, & NOTES
WT-E0.2......... ELECTRICAL DETAILS
WT-ED1.01 .... ELECTRICAL DEMOLITION 1ST & 2ND PLANS
WT-EP1.01B... ELECTRICAL – 1ST & 2ND PLANS

END OF DOCUMENT
INVITATION TO BID

PROJECT: Elevator Modernization
Various Facilities
Statewide, Tennessee
SBC No. 529/000-01-2014

DESIGNER: Gould Turner Group, P.C.
4400 Harding Road, Suite 1000
Nashville, Tennessee 37027
Mr. Leonard Simms
Phone: 615-297-3122
Email: lsimms@gouldturner.com

BRIEF PROJECT DESCRIPTION:


Bids are invited for a General Contract for the Work of the above project.

A Pre-Bid Conference will be held at the WRS Tennessee Tower, Conference Room K, on June 25, 2015 at 1:00 pm local time (Central Time).

Bids sent by mail or courier service should be directed to the attention of

Ms. Penny DiPiazza, Bidding and Contract Officer
William R. Snodgrass Tennessee Tower
Suite 2200, 312 Rosa L. Parks Avenue
Nashville, TN 37243-1102
Phone (615) 741-6111.

Bids will be received and publicly opened by the Designer on behalf of the State of Tennessee at

William R. Snodgrass Tennessee Tower
Conference Center North
Room 3.126 (Conference Room G)
3rd Floor
312 Rosa L. Parks Avenue
Nashville, TN 37243-1102

Until 1:00 pm local time (Central Time) on Tuesday Jul 14, 2015.

Bidding Documents may be examined at the Designer's office and at the following Plan Rooms:

Nashville, TN: Dodge Data and Analytics, Nashville Contractors Association, Associate General Contractors
Jackson, TN: West Tennessee Plan Room
Norcross, GA: CMD

Bidding Documents may be obtained from the Designer in accordance with the Instructions to Bidders upon the Designer's receipt of a certified or cashier's check made payable to the State of Tennessee in the amount per set of $1000.00.
Bidders submitting bids equal to or greater than $25,000 in value are required to be licensed in accordance with state law. A statement of public contract crime status and minority business status is required in the Bid Form. A five percent (5%) bid security is required.

The Owner reserves the right to waive informalities and to reject bids.
INSTRUCTIONS TO BIDDERS

BIDDING DOCUMENTS
1.1 Bonafide prime Bidders and major subcontractors may obtain one Bid Pack, including Bidding Documents, Bid Envelope, and Bid Form, in accordance with provisions of the Invitation to Bid.

1.2 Individuals or firms securing Bid Packs become Bidders of Record, are automatically issued subsequent Addenda, and will have deposit refunded upon returning complete Bidding Documents unmarked and in good condition within fifteen (15) days after the scheduled opening of bids. Bidders of Record who do not submit a bid are also required to return the unused Bid Envelope. Upon failure to meet these conditions, deposit shall be forfeited.

1.3 Bidders of record may obtain additional copies of bidding documents at cost from Designer, but costs will not be refundable.

EXAMINATION
2.1 Bidders shall carefully examine site and documents to obtain first-hand knowledge of existing conditions and Work proposed. Copies of standards referenced in Project Manual are available for review through Designer's office.

2.2 Contractor will not be given extra payment for conditions which can be determined by examining site and documents.

QUESTIONS
3.1 Bidders shall submit questions about Bidding Documents to Designer in writing. Replies will be issued to Bidders of Record by Addenda and will become part of Contract Documents. Designer and Owner will not make oral clarifications.

3.2 Questions must be received by Designer at least four (4) calendar days before bid opening date.

3.3 In compliance with Tennessee Code Annotated 12-4-113, no Addenda will be issued less than forty-eight (48) hours of the bid opening, excluding weekends and legal holidays. The exception would be Addenda to extend the bid deadline.

3.4 Normal practice is that no Addenda affecting pricing will be issued less than three (3) calendar days before bid opening date.

SUBSTITUTIONS
4.1 Substitutions before receipt of bids shall be as identified in Conditions and Division 1 specifications. To request pre-bid approval of substitution, data required by Designer for evaluation must be received ten (10) calendar days before date set to receive bids. Acceptable substitutions will be identified in Addenda.

4.2 Bidders submitting bids in reliance upon a substitution when the substitution has not been approved prior to bidding do so at their own risk.

LIQUIDATED DAMAGES AND TIME
5.1 Conditions for liquidated damages are established in the Conditions. Time for completion and amount of liquidated damages are identified in bid form.

LICENSING AND QUALIFICATIONS
6.1 Bidders shall be familiar with the Contractors Licensing Act of 1976, as currently amended (codified in Tennessee Code Annotated Sections 62-6-101, et seq.). A contract will not be awarded to a bidder whose bid is in conflict with state licensing law.

6.2 In compliance with Tennessee Code Annotated Section 50-9-114(a), prospective bidders are advised that the Owner does not operate a certified drug-free workplace program providing for testing.

6.3 Bids submitted for this project shall not include a contractor or subcontractor that is disqualified from participating in State construction projects under the supervision of the State Building Commission. As a matter of public record, the State Architect maintains a list of those that are disqualified, and the Owner endeavors to include a current copy of that list in the bidding requirements for its projects as Information Available to Bidders. Failure to include a current list shall not negate the effect of disqualification.

PRE-BID CONFERENCE
7.1 Pre-bid conference may be held approximately ten (10) days prior to bid opening date to place to be announced. Bidders of Record will be notified in writing whether or not a pre-bid conference will be held.

BID FORM
8.1 Make bids on an unaltered Bid Form furnished by the Designer in Bid Pack and duplicated in Project Manual. Submit one Bid Form. Failure to completely fill out Bid Form may cause bid to be rejected.

8.2 If a Bidder chooses not to bid an alternate, unit price, or base bid in a multiple base bid project, write "no bid" in the space. To indicate availability of an add alternate at no additional charge, write "no charge" in the space. Additional stipulations or qualifications on Bid Form may cause bid to be rejected.

8.3 Bid Form shall be signed by person or persons legally authorized to bind Bidder to Contract.

BID SECURITY
9.1 Bid security is required in the amount of five percent (5%) of total amount bid, including alternates, made payable to State of Tennessee.

9.2 Bid Bonds shall be issued by surety company licensed to do business in Tennessee by Tennessee Department of Commerce and Insurance, and shall have certified and current power-of-attorney for attorney-in-fact attached.

9.3 Checks shall be certified or cashier's payable in U.S. dollars drawn on a U.S. bank. Bid security submitted in the form of a check is deposited by the Owner until conditions for a refund are met, and then refunded in accordance with normal State requirements for prompt payment. In order to obtain such a refund, the bidder must submit a completed Substitute W-9 Form, using the form of Section 00 54 35, within thirty (30) days of the bid opening. Bid security that has been deposited is valid for the one bid, and is not transferable to another bid.

9.4 Owner may retain bid security of bidders to whom award is being considered until either (a) Contract has been executed, or (b) specified time has elapsed so that bid is not binding, or (c) bid has been rejected. If Bidder refuses to enter into Contract or fails to furnish all required attachments properly executed, the amount of bid security shall be forfeited to Owner as liquidated damages, not as penalty.

BID SUBMITTAL
10.1 Submit Bid Form, with required attachments, in Owner's Bid Envelope furnished by Designer in Bid Pack. Bidder shall fill in blank spaces on face of Bid Envelope, except blank provided for Designer's approval. When filling in base bid or alternate(s), bid amount in words takes precedence over the numerical amount.

10.2 If any work, regardless of dollar value, is required for plumbing, HVAC or electrical, list subcontractor that will perform that work. If Bidder will perform that work with Bidder's own forces, fill in Bidder's name as subcontractor. If the project
requires a geothermal subcontractor, list subcontractor and the
Tennessee Environment and Conservation's permit number and
classification. If amount of masonry work is such that a masonry
license is required, list the subcontractor and license number. If
no work is required in a category, write "N/R" (None Required) or
"N/A" (Not Applicable) in space provided for subcontractor(s).

10.3 Provide State contractor license number, expiration
date, and applicable classifications for Bidder and listed
subcontractors, as applicable by State licensing law. If the value
of subcontractor's work is such that no license is required, and
subcontractor is unlicensed, fill in "N/A" in the license number
column, but still fill in name.

10.4 Bidders are solely responsible for ensuring that bids
are received by the time and at the place identified for receipt
of bids. A Bid sent by mail shall be enclosed in an envelope clearly
marked "Bid Envelope Enclosed". Bids received late will be
returned unopened. Please note that some State office buildings
x-ray incoming mail and parcels. This could delay receipt of a bid
reaching its intended destination in a timely manner.

RECEIPT AND OPENING OF BIDS

11.1 Bids will be received and opened at time and place
identified in invitation to Bid.

WITHDRAWAL AND MODIFICATION PRIOR TO
CLOSE OF BIDDING

12.1 Bids, once submitted, may be withdrawn or modified
before the scheduled opening time only upon receipt of request
signed by a person legally authorized to bind bidder to contract.
If Bid is withdrawn, it may not be resubmitted. Modification to a
bid amount may be made as "add" or "deduct" only. Oral,
telephonic, telegraphic or electronic mail withdrawal or modification
will not be considered. After time and date
specified for receipt of bids, bid may not be modified during
time period stipulated in Bid Form.

POST-BID WITHDRAWAL OF BID FROM
CONSIDERATION DUE TO MISTAKE

13.1 Request to withdraw bid due to mistake must be in
writing to Owner, delivered in person or postmarked certified or
registered mail not later than twenty-four (24) hours after the time
fixed for receipt and opening of bids. Request shall acknowledge
that bidder refuses to enter into contract based on bid and
intends to submit original work papers, documents, and materials
used in preparation of the bid in like manner within five (5)
working days following date of bid opening.

13.2 Bidder making such request will be removed from
consideration for award of contract; and, a duly appointed review
panel shall consider whether forfeiture of bid security should be
waived.

CONSIDERATION OF BIDS

14.1 To be considered, bids shall be made in accordance
with these instructions to Bidders. Failure to comply with these
bidding requirements may cause bid to be rejected.

14.2 The Owner reserves right to: reject unit prices
proposed in a bid without invalidating other portions of bid; reject
a bid which does not provide all required unit prices; waive
informalities; and, reject any or all bids.

14.3 It is Owner's intent to award a contract, or multiple
contracts in the case of multiple base bids, based upon lowest
evaluated responsive bid submitted by responsible bidder for
base bid plus alternates (if any) taken in order up to, but not to
exceed the bid target. If the base bid of all bidders exceeds the
established bid target, the low bidder is determined by the lowest
base bid submitted by a responsible bidder irrespective of any
alternates (if any) bid. When alternates are included in bidding,
bid target will be announced at bid opening prior to opening bids.
Alternates may be accepted or rejected at Owner's discretion,
provided that final combination of base bid and accepted
alternates does not change low bidder as established by above
method.

14.4 When a tie bid exists, a lot or coin toss will be
conducted until a successful bidder is determined.

14.5 In the case of a multiple base bid, Owner may award
a combined contract for the Work of more than one base bid if the
same bidder is the successful low bidder on each.

POST BID INFORMATION

15.1 Should a bidder wish to protest a Bid, the bidder shall
submit a Protest Bond to the Owner in the amount of five percent
(5%) of the protester's bid amount within seven (7) calendar days
of the Bid opening. An example of Any Bid protests shall be
submitted in accordance with SBC By-laws, Policy and
Procedure, Item 18.

15.2 Each Bidder shall be prepared, if requested by Owner
or Designer, to present evidence, within ten days of the request,
of experience, qualifications, and financial ability to carry out the
terms of the contract.

BONDS

16.1 Successful bidder shall provide Bonds as required by
the Bidding Documents and in accordance with paragraph 11.5.1
of the Conditions and paragraph 17.1 below. Bond forms shall be
the State of Tennessee standard bond forms, which are
sequenced in Project Manual as listed in Table of Contents.
Contract Bond, if required, shall be in the amount of one hundred
percent (100%) of the Contract sum. Three-Year Roof Bond, if
required, shall be in an amount as stipulated on the Bid Form.

EXECUTION OF THE CONTRACT

17.1 If a Bidder is presented the written Agreement Form for
signature, then that Bidder shall deliver to the identified Owner's
representative, within five (5) calendar days after presentation,
the required number of counterparts of the signed Agreement
Form, Contract Bond (if required), Roof Bond (if required),
certificates of insurance, and an "Authorization Agreement for
Automatic Deposits (ACH Credits) Form".

17.2 For the purpose of computing time, the five (5) days
referred to in paragraph 17.1 above commence the day after
receipt of the Agreement Form by Bidder. Should the fifth day fall
on a State holiday, or weekend, Bidder shall provide required
documents as directed no later than the next working day;
however, regardless of circumstances or causes for Bidder
exceeding delivery time, Owner shall be entitled to either require
further security or to add for each day the Bidder exceeds the five (5)
days period a corresponding extra day in which to return a fully executed contract, which return will be
considered effectuated by mailing Agreement to the Contractor
within the required time plus any extensions provided herein.

AWARD OF THE CONTRACT

18.1 Presentation of Agreement Form by Owner to Bidder
for signature does not constitute award of Contract. Contract
shall not be awarded until Bidder has received a fully
executed Agreement.

PARTICIPATION OF
DIVERSITY-OWNED BUSINESSES

19.1 It is the express desire of the State Building
Commission to include an emphasis on diversity in its contractual
relationships with contractors for the construction, demolition or
renovation of State projects under the jurisdiction of the
Commission. The Commission acknowledges that firms who
demonstrate and embrace diversity within their programs and
policies are assisting the State in achieving its goals in building a
more reflective marketplace of the community within this state.

19.2 It is a requirement of all successful bidders on projects
under the jurisdiction of the State Building Commission that they
report to the Owner the names and amounts of contracts entered
into with "Disadvantaged or Diversity-Owned Businesses" on their
contract with the Owner in order for the Owner to collect data on
such participation.
SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

MODIFICATIONS

to the

INSTRUCTIONS TO BIDDERS

Following supplements modify, change, delete from or add to "Instructions to Bidders". Where an Article, Paragraph, Subparagraph, or Clause thereof is modified or deleted by these Supplementary Instructions to Bidders, unaltered provisions of that Article, Paragraph, Subparagraph, or Clause shall remain in effect.

STREAM Std Instructions to Bidders

BID SUBMITTAL

(Delete paragraph 10.1 in its entirety and replace with the following:)

10.1 Submit Bid Form, with required attachments, in Owner's Bid Envelope furnished by Designer in Bid Pack. Affix to Bid Envelope the Subcontractor Multi-Site Bidding Form, Section 00 22 13.26, as shown in Project Manual. Bidder shall fill in blank spaces on face of Bid Envelope and Multi-Site Bidding Form, except blank provided for Designer's approval. If the Contractor is proposing using the same subcontractor(s), at all locations, the Multi-Site Bidding Form is not required with bid submission. The subcontractor(s) shall be listed on the face of Bid Envelope.

END OF SUPPLEMENTARY INSTRUCTIONS TO BIDDERS
SUBCONTRACTOR MULTI-SITE BIDDING FORM  
(for multiple-site projects)

Project: Elevator Modernization Various Facilities    SBC No. 529/000-01-2014

Bidder: _________________________________

**Subcontractors to be used on this Project:** (or Bidder, if Bidder is to perform the work)

- If **any** work, regardless of dollar value, is required for subcontractor category, list subcontractor that will perform that work. Or, if Bidder will perform work in a category with Bidder's own forces, fill in Bidder's name as subcontractor.
- If **no** work is required in a subcontractor category, write "N/R" (None Required) or "N/A" (Not Applicable).
- If the monetary amount of a subcontractor's work is such that no license is required, "N/A" may be written in the license number column, but still write name.

<table>
<thead>
<tr>
<th>Subcontractor</th>
<th>License Number</th>
<th>Expiration Date</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITE:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plumbing</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>HVAC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masonry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geothermal</td>
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<td></td>
<td></td>
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<tr>
<td><strong>SITE:</strong></td>
<td></td>
<td></td>
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<tr>
<td>Plumbing</td>
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<td>HVAC</td>
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<td>Electrical</td>
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<td>Masonry</td>
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<td>Geothermal</td>
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<tr>
<td>Masonry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geothermal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
HAZARDOUS MATERIALS INVESTIGATION AND REPORT:

A. An investigation has been performed at the project site to determine the presence and probable extent of hazardous materials in the existing building materials. This investigation was conducted, and a report obtained, solely for design purposes and is not a part of the Contract Documents.

B. The use and interpretation of this information is entirely the responsibility of the using party. The Owner is not responsible for variations in the actual composition of existing materials. Bidders shall decide for themselves the character and quantities of the material to be encountered.

C. The report of the findings of this investigation is on file in the Designer's office, and may be reviewed there by any prospective Bidder of Record. Bidders must call ahead to schedule an appointment.

END OF SECTION
DISQUALIFIED CONTRACTORS AND SUBCONTRACTORS

LISTING OF DISQUALIFIED CONTRACTORS AND SUBCONTRACTORS:

1. These contractors and subcontractors are disqualified from participating in State construction projects under the supervision of the State Building Commission for the duration of the dates indicated. Such disqualification extends to succeeding or related corporations, partnerships, joint ventures, and other business organizations having substantial factual or legal connections, continuity, or identity with those that have been disqualified.

2. This list originates from the State Architect, and is deemed accurate as of the date of its issue, and may also be viewed on the Finance and Administration Web page at http://www.tn.gov/finance/OSA/contractorsinfo.shtml a more current list may be available.

3. Debarment of a contractor or sub-contractor by any other state agency may be cause for debarment of award of a contract on projects under the jurisdiction of the State Building Commission. A listing of debarred contractors for the Central Procurement Office, Department of General Services, can be obtained through their office.

There are currently no disqualifications in effect.

END OF SECTION
BID FORM

BID TO: STATE OF TENNESSEE
For the Project Titled: Elevator Modernization Various Facilities Statewide, Tennessee SBC No. 529/000-01-2014

A. The Bidder acknowledges in submitting this bid that:

1. Bidder has received, read, and understands the Bidding Documents, has visited the site and become familiar with local conditions under which work is to be performed, has correlated observations with requirements of Bidding Documents, and makes this bid in accordance therewith.

2. Information Available to Bidders, identified in 003000 series documents in the Bidding Requirements, were prepared solely for Designer's use in design of this Work and have not been relied upon in the preparation of this bid. The use and interpretation of such information for any purposes is entirely the responsibility of the using party.

3. Contractors and Subcontractors that have been disqualified from participating in State Building Commission projects have not been included in this bid, and will not be allowed to perform work under the contract that may result.

4. This Bidder shall not knowingly utilize the services of an illegal immigrant in the performance of this Contract and shall not knowingly utilize the services of any subcontractor or consultant who will utilize the services of an illegal immigrant in the performance of this Contract.

5. The required Bid Security, in the amount of five percent (5%) of the total amount bid, is attached hereto.

6. Failure to complete Bid Form, provide required attachments, or comply otherwise with the Instructions to Bidders, may be cause for rejection of bid.

7. The person who signs this bid on behalf of the Bidder is required to be legally empowered to bind the Bidder to a Contract.

8. This Bidder's status, as required by State Building Commission Policy and Procedures, is:

   The Bidder and/or any of the Bidder's employees, agents, independent contractors and/or proposed subcontractors have been convicted of, pled guilty to, or pled no lo contendre to any contract crime involving a public contract.

   (True or False)

9. This Bidder's status, as required by State Building Commission Policy and Procedures, is:

   Bidder is a “Certified Diversity or Disadvantaged Business Enterprise,” Women Business Enterprise, Small Business Enterprise, Minority Business Enterprise, or Service-Disabled Veteran Business Enterprise per TCA §12-3-1102.

   If “Yes”, then check the applicable Box and name the Certifying Agency.

   □ Woman Business Enterprise  □ Small Business Enterprise  □ Minority Business Enterprise  □ Service-Disabled Veteran Business Enterprise

   Certifying Agency: ________________________________

10. This Bidder has received the following addenda:

    Addendum No. _____ dated _____________ Addendum No. _____ dated _____________

    Addendum No. _____ dated _____________ Addendum No. _____ dated _____________

    Addendum No. _____ dated _____________ Addendum No. _____ dated _____________
B. This Bidder agrees to:

1. Honor this bid for a period of sixty (60) days following the date of the scheduled opening of bids.

2. Enter into and execute a contract, if presented on the basis of this bid, and furnish certificate(s) of insurance, bonds, and other documents related to the contract as required by the Bidding Documents.

3. If required by the Bidding Documents, furnish Three-Year Roof Bond in the amount of:

   Not Applicable

4. Accomplish the Work in accordance with the Contract Documents.

5. Achieve Substantial Completion of the Work and each Phase thereof in accordance with the number of calendar days Contract Time allotted each, from and including the Commencement of each; and accept the conditions for Liquidated Damages in the amount set forth for each, wholly and severally for the Work and each Phase:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Commencement</th>
<th>Contract Time</th>
<th>Liq. Damages</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>Notice to Proceed for all Work</td>
<td>734 Days</td>
<td>$1000 Per Day</td>
</tr>
<tr>
<td>I</td>
<td>Notice to Proceed for all Work</td>
<td>734 Days</td>
<td>$1000 Per Day</td>
</tr>
<tr>
<td>II</td>
<td>Notice to Proceed for all Work</td>
<td>652 Days</td>
<td>$1000 Per Day</td>
</tr>
<tr>
<td>III</td>
<td>Notice to Proceed for all Work</td>
<td>291 Days</td>
<td>$1000 Per Day</td>
</tr>
<tr>
<td>IV</td>
<td>Notice to Proceed for all Work</td>
<td>197 Days</td>
<td>$1000 Per Day</td>
</tr>
</tbody>
</table>

6. Complete the Work of the Base Bid for this project for the lump sum of:

   **Base Bid:**

   $ _____________________________

   (Amount shown in both words and figures) $ _____________________________

7. Propose the following Unit Prices, and include the total calculated value (i.e., the Base Quantity indicated in Section 01 22 19 multiplied by proposed Unit Price) of each Unit Price in the bid amounts above, and agree to their use in the construction contract, if accepted by Owner:

<table>
<thead>
<tr>
<th>Item Description (See Section 01 22 19)</th>
<th>Unit Price per Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tennessee Tower, Elevators 1-10 Motor Refurbishment</td>
<td>$ __________________ per Motor</td>
</tr>
<tr>
<td>Andrew Jackson, Elevators 1-7 Motor Refurbishment</td>
<td>$ __________________ per Motor</td>
</tr>
</tbody>
</table>

**This bid submitted by:**

Authorized Signature ___________________________ Date ___________________________

Name ___________________________ Title ___________________________

On behalf of: (Name of Bidder) ___________________________

Federal Employer Identification Number (EIN) ___________________________

Address ___________________________

(Street & Mailing Address) ___________________________

Telephone No. ___________________________ Facsimile No. ___________________________

Email ___________________________
AGREEMENT FORMS

STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

A. Form of Agreement will be that shown as document 00 52 13 of this project manual, and will be filled out as indicated below.

B. The following information and provisions will be filled in prior to the presentation of the Agreement form to Contractor by Owner.

1. Contracting Agency, Contractor, Project, and Designer will be identified on page one.

2. A full enumeration of the Contract Documents which make up the Agreement will be provided in Article 1.


4. The Contract Sum and the basis upon which it is determined, and Unit Prices proposed as a part of the successful bid which are accepted by the Owner, will be stated in Article 3.

5. The signature page will provide for a single signature by the Contractor, and will provide for the several signatures on behalf of the Owner as required by law and policy.

C. Date of Agreement will be filled in by Owner when last signature is affixed. Last signature will be by Owner.

END OF SECTION
Standard Form of Agreement Between Owner and Contractor

where the Basis of Payment is a STIPULATED SUM

Use only with the coordinated documents identified in the current Designers' Manual for projects of the State Building Commission of Tennessee

AGREEMENT

made as of the day of in the year of
Two Thousand and

BETWEEN the Owner: STATE OF TENNESSEE
via the Contracting Agency:

and the Contractor:

the Project:

the Designer:

The Owner and the Contractor agree as set forth below.
ARTICLE 1
THE WORK AND THE CONTRACT DOCUMENTS

1.1 The Contractor shall perform all the Work required by the Contract Documents for the Project identified on page one.

1.2 The Contract Documents are identified in the Conditions of the Contract (General, Supplementary, and other Conditions). These form the Contract and constitute the entire agreement between the Owner and the Contractor, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. An enumeration of the Contract Documents appears in paragraph 1.4.

1.3 Terms used in this Agreement which are defined in the Conditions of the Contract shall have the meanings designated in those Conditions.

1.4 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:
ARTICLE 2
TIME OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

2.1 The Work to be performed under this Contract shall be commenced on the date stipulated in the Notice to Proceed; and, subject to authorized adjustments, Substantial Completion shall be achieved.

2.2 Liquidated Damages, as set forth in paragraph 9.12 of the Conditions, are

ARTICLE 3
CONTRACT SUM

3.1 The Owner shall pay the Contractor in current funds for the performance of the Work, subject to additions and deductions by Change Order as provided in the Contract Documents, the Contract Sum of

3.2 The Contract Sum is determined as follows:

3.3 The following Unit Prices will be used as specified:
This instrument may be executed in one or more counterparts. It shall be fully executed when each party whose signature is required has signed at least one (1) counterpart, even though no one (1) counterpart contains the signatures of all the parties to this instrument. Electronic, scanned or facsimile signatures shall have the same force and effect as original signatures. This Agreement entered into as of the day and year first written above as witnessed:

BY CONTRACTOR:

Signature: __________________________________________
Name: __________________________________________
Title: __________________________________________

AND BY OWNER:  STATE OF TENNESSEE

APPROVED: __________________________________________
The State Architect, State Architect (All Contracts)

APPROVED: __________________________________________
The Commissioner of General Services (All Contracts that are not Department of Military) or The Adjutant General, Military (All Department of Military Contracts)

APPROVED: __________________________________________
The Comptroller, Comptroller of the Treasury
for compliance with policy and statute (Required if Contract Amount is over $100,000)

APPROVED: __________________________________________
The Attorney General, Attorney General
for form and legality (Required if Contract Amount is over $500,000)

END of AGREEMENT FORM for the Project titled:

00 52 13
AUTHORIZATION AGREEMENT
FOR
AUTOMATIC DEPOSITS
(ACH Credits)
FORM

REFERENCES
A. Refer to paragraph 17.1 of Instructions to Bidders.
B. Refer to paragraph 9.11 of the Conditions of the Contract.

FORM

Use the "Authorization Agreement for Automatic Deposits (ACH Credits) Form" which will be provided by the Owner at the time of presentation of the Agreement form for signing. A copy of this form is provided immediately following this page for information purposes only.

COMPLETION OF FORM

A. Fill out the form in its entirety:
B. Inquiries regarding completion of the form should be made to:
   State of Tennessee, Department of Finance and Administration
   Office of Business and Finance (615) 741 - 2590
STATE OF TENNESSEE
DEPARTMENT OF FINANCE AND ADMINISTRATION

ACH (AUTOMATED CLEARING HOUSE) CREDITS (Not Wire Transfers)

NAME _____________________________________________________________________________________

Federal Identification Number or Social Security Number ________________________________
(under which you are doing business with the State.)

I (We) hereby authorize the State of Tennessee, hereafter called the STATE, to initiate credit entries to my (our)
(select type of account) _____ CHECKING or _____ SAVINGS account indicated below and the depository named
below, hereinafter called DEPOSITORY, to credit the same to such account.

This authority is to remain in full force and effect until the STATE has received written notification from me (or
either of us) of its termination in such time and in such manner as to afford the STATE and DEPOSITORY a
reasonable opportunity to act on it.

*********************************************************************************************************************************
Do you currently receive payments from the State through ACH?_____ (Yes or No).  If yes, do you intend for this
account information to replace other existing account information currently used by the State?_____ (Yes or No).
If yes, please specify the account that should be changed:  ABA No._____________ Account No.____________.
Is this authorization only for certain types of payments?_____ (Yes or No).  If yes, please indicate types:

*********************************************************************************************************************************
Many banking institutions use different numbers for ACH.  Please call your bank for verification of ACH transit and
account number.

Bank official contacted: ___________________________________ Phone No. ___________________________

*********************************************************************************************************************************

DEPOSITORY/BANK NAME _____________________________________________ BRANCH _______________________

CITY _____________________________ STATE ________________

ACH TRANSIT/ABA NO. ____________________________ ACCOUNT NO. ________________________

NAME(S) _____________________________
(Please print names of authorized account signatory)

DATE _______________ SIGNED X ___________________ SIGNED X _________________________

PLEASE ATTACH A VOIED CHECK (OR FOR SAVINGS ACCOUNTS, A DEPOSIT SLIP):

PLEASE INDICATE ADDRESS TO WHICH YOU WOULD LIKE YOUR REMITTANCE
ADVICES ROUTED WHEN PAYMENTS ARE PROCESSED:

______________________________________________________________
______________________________________________________________

Contact name: ________________________________________________
Telephone no.: ________________________________________________

FA-0825
(Rev. 4/96)
SUBSTITUTE W-9 FORM
REQUEST FOR TAXPAYER IDENTIFICATION NUMBER AND CERTIFICATION

1. Complete general information:
Taxpayer Name ___________________________ Phone Number ___________________
Business Name (if applicable) ________________________________________________
Address ___________________________________________________________________
City __________________________________ State ___________ ZIP Code _____________

2. Circle the most appropriate category below: (circle only one)
   1) Individual (not an actual business.)
   2) Joint account (two or more individuals.)
   3) Custodian account of a minor.
   4) a) Revocable savings trust (grantor is also trustee.)
       b) So-called trust account that is not a legal or valid trust under state law.
   5) Sole proprietorship (using a social security number for the taxpayer ID.)
   6) Sole proprietorship (using a federal employer identification number for taxpayer ID.)
   7) A valid trust, estate, or pension trust.
   8) Corporation.
   9) Association, club, religious, charitable, educational, or other not-profit organization (for entities that are exempt from federal tax, use category 13 below).
   10) Partnership.
   11) A broker or registered nominee.
   12) Account with the U.S. Department of Agriculture in the name of a public entity that receives agricultural program payments.
   13) Government agencies and organizations that are tax-exempt under Internal Revenue Service guidelines (i.e., IRC 50(c)3 entities).

3. Fill in your taxpayer identification number below: (complete only one)
   1) If you circled number 1 - 5 above, fill in your Social Security Number:
      ___________ ___________ ___________
   2) If you circled number 6 - 13 above, fill in your Federal Employer Identification Number (EIN):
      ___________ ___________ ___________ ___________ ___________ ___________

4. Sign and date the form:

Certification – Under penalties of perjury, I certify that the number shown on this form is my correct taxpayer identification number. If I circled category 13 above, I also certify that my agency or organization is tax-exempt per Internal Revenue Service guidelines and not subject to backup withholding.

Signature ___________________________ Date ___________________________
Print Name ___________________________ Title ___________________________
SECTION 00 54 43
RETAINAGE ESCROW INITIATION

PART 1 - GENERAL

1.01 Basic Requirements

A. Retainage escrow requirements are mandated by Chapter No. 340 House Bill No. 966 Public Acts of 1985 which was passed by the Tennessee General Assembly.

B. Conditions of Contract, in accordance with State law, require retainage to be deposited into an interest-bearing escrow account if the Contract Sum Five Hundred Thousand and no/100ths Dollars ($500,000) or greater. Compliance is mandatory and cannot be waived.

C. Failure to have the escrow account operational by the time of the contractor’s second application for payment can result in delay of payment or inability of the Owner to make payment. Any such delay or inability to pay will not be grounds for relief under the prompt payment statutes.

1.02 The banking institution handling the retainage escrow account must be in an appropriate custodial care agreement with the State Treasurer. If not already in such an agreement, a banking institution can request such an agreement from the State Treasurer, subject to meeting eligibility requirements of TCA section 12-4-108(c).

1.03 Getting Started

A. Shortly after award of Contract, the Tennessee Department of Finance and Administration (F&A) will send the Contractor the latest information for starting the account. This information typically includes:

1. Procedural guide,
2. Forms, including the basic application, colloquially referred to as "Form A", and
3. List of banks that currently have agreements with the State to host retainage escrow accounts.

B. Getting help

1. The instructions from F&A will include a name and phone number to call for help:
   a. If the Contractor needs help completing Form A,
   b. If the Contractor plans to use a lending institution that does not have a current agreement with the State for hosting retainage escrow.

2. At the time this standard specification is written (see bottom left of page) the contact person for help in setting up new escrow accounts and completing Form A is Mary Mansour at (615)741-1317.

C. To avoid delays in setting up the escrow, and possible delays in payment, do not wait to be contacted by F&A as described above. Instead, if the Contract Sum is Five Hundred Thousand and no/100ths Dollars ($500,000) or greater, upon award of the Contract, please have the escrow bank complete, execute, and send the original wet-signature Form A to:

   ATTN: Mary Mansour
   Tennessee Department of Finance and Administration
   Office of Business and Finance
   Suite 2000 William R. Snodgrass Tennessee Tower
   312 Rosa L. Parks Avenue
   Nashville TN 37243-0294

1.04 A sample of Form A is provided on page 2 of this Section.
FORM A
APPLICATION FOR THE SUBSTITUTION OF SECURITIES FOR ALL AMOUNTS RETAINED ON STATE BUILDING COMMISSION CONSTRUCTION CONTRACTS

Date: __________________________

RE: Contract Number: __________________________
Project No.: __________________________
Location: __________________________

Dear State Building Commission:

Pursuant to the provisions of Tennessee Code Annotated, Sections 12-4-108,

Contractor's name and address as appearing on construction Contract:

hereby requests that whenever payment for which certain amounts are retained by the State Building Commission as determined by the subject construction contract, the amount so retained be substituted for approved securities, as designated by the Tennessee State Treasurer.

The undersigned Contractor hereby appoints __________________________ (Name of Banking Institution)
located at __________________________ (Complete Address of Banking Institution)
to be its agent and attorney-in-fact to receive all amounts retained by the State Building Commission under the provisions of the subject construction Contract and to purchase Retainage Securities of the following type:

________________________________________ (Description)

The appointed Banking Institution, as indicated by the acceptance signature shown below, agrees to enter or has already entered into a Trust Agreement with the Tennessee State Treasurer to act as custodian and servicing agent of Retainage Securities and to perform all assigned duties and responsibilities with respect thereto as set forth in the Trust Agreement, which is herein incorporated by reference.

Very truly yours,

(Signature of Authorized Representative of Contractor) __________________________ (Title)

ACCEPTED:

(Signature of Authorized Officer of Banking Institution) __________________________ (Title)

CONTACT PERSON (BANK) __________________________ PLEASE PRINT

PHONE NUMBER __________________________

END OF SECTION
CONTRACT BOND
TENNESSEE STATE BUILDING COMMISSION STANDARD FORM

BOND NO. ____________________________

Know all men by these presents: that we

(hereinafter called the "Principal") and

(hereinafter called the "Surety") do hereby acknowledge ourselves indebted and securely bound and held unto

(hereinafter called the "Owner"), and in the penal sum of

good and lawful money of the United States of America, for the use and benefit of those entitled thereto, for the payment of which, well and truly to be made, we bind ourselves, our heirs, our administrators, executors, successors, and assigns, jointly and severally, firmly by these presents.

But the condition of the foregoing obligation or bond is this:
Whereas, the Owner has engaged the principal for the sum of

to complete the Work of the project titled:

as more fully appears in a written agreement or contract bearing the date of

a copy of which said agreement or contract is by reference hereby made a part hereof, as fully and to the same extent as if copied at length herein, and it is the desire of the Owner that the Principal shall assure all undertakings under said agreement or contract and shall assure and protect all laborers and furnishers of material on said Work both as provided by Tennessee Code Annotated Sections 4-15-102 (f)(2) and 12-4-201 through 12-4-206, and any and all amendments thereto, and shall assure the prompt payment of claims as provided by Tennessee Code Annotated Sections 12-4-207 through 12-4-208, and any and all amendments thereto. The Principal shall also comply with provisions of Tennessee Code Annotated Sections 12-4-401 through 12-4-415, and any and all amendments thereto, pertaining to the payment of the prevailing wage rate.
Now, therefore, if the Principal shall fully and faithfully perform all undertakings and obligations under the contract hereinbefore referred to and shall fully indemnify and hold harmless the Owner from all costs and damage whatsoever which it may suffer by reason of any failure on the part of the Principal to do so, and shall fully reimburse and repay the Owner any and all outlay and expense which it may incur in making good any such default, and shall fully pay for all of the labor, material and work used by the Principal and any immediate or remote sub-contractor or furnisher of material under him in the performance of said contract, in lawful money of the United States, as the same shall become due, then this obligation or bond shall be null and void, otherwise to remain in full force and effect.

And for value received, it is hereby stipulated and agreed that no change, extension of time, alteration or addition to the terms of the contract or to the Work to be performed thereunder or to the specifications accompanying the same shall in any wise affect the obligation under this bond, and notice is hereby waived of any such change, extension of time, alteration or addition to the terms of the contract or to the Work or to the specifications.

In witness whereof the Principal has hereunto affixed its signature and Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this _____ day of ______________, 20___.

Executed in ________ counterparts.

Witness:

______________________________
(name of Principal)

______________________________
(name of Surety)

______________________________
(authorized signature)

______________________________
(signature of Attorney-in-fact)

______________________________
(name of signatory)

______________________________
(name of Attorney-in-fact)

______________________________
(title of signatory)

(Tennessee license number of Agent or Attorney-in-fact)

______________________________
(countersignature of resident Agent if not same as Attorney-in-fact)

Surety Company issuing bond shall be licensed to transact business in State of Tennessee by Tennessee Department of Commerce and Insurance. Bonds shall have certified and current Power-of-Attorney for the Surety’s Attorney-in-Fact attached. Attorney-in-fact who executes bond on behalf of Surety shall be licensed by and a resident of State of Tennessee, and shall affix license number to bond; or, countersignature by a licensed agent who is a resident of State of Tennessee, and the agent’s license number, shall be affixed to the bond in addition to the signature of the Attorney-in-Fact.
STATE OF TENNESSEE

COUNTY OF: __________________________

Project Name: __________________________

SBC Project No.: __________________________

By the signature below, the signatory for the Contractor certifies that neither he/she nor the firm, corporation, partnership or institution represented by the signatory or anyone acting for the firm providing Construction Services for this project, including Subcontractors, have utilized materials, procedures or processes that knowingly or intentionally contain asbestos materials.

Signature: __________________________ Printed Name: __________________________

Title: __________________________ Company: __________________________

Date: __________________________

State of Tennessee,
County of __________________________

Sworn to and subscribed before me on the ______ day of ________________, 20___ by __________________________ the undersigned authority on behalf of said Contractor.

(name/signature of signer)

Notary Public’s Signature: __________________________ Printed Name: __________________________

My commission expires: __________________________

(Personalized Seal)
for the following PROJECT:
(Name and location or address):
all State of Tennessee, Department of Finance and Administration General Work RPA 00 72 13 July 2009

THE OWNER:
(Name, legal status and address): State of Tennessee, Department of Finance and Administration

THE ARCHITECT:
(Name, legal status and address):

DESIGNER:
as identified in the agreement

TABLE OF ARTICLES

1 GENERAL PROVISIONS
2 OWNER
3 CONTRACTOR
4 ADMINISTRATION OF THE CONTRACT
5 SUBCONTRACTORS
6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
7 CHANGES IN THE WORK
8 TIME
9 PAYMENTS AND COMPLETION
10 PROTECTION OF PERSONS AND PROPERTY
11 INSURANCE AND BONDS
12 UNCOVERING AND CORRECTION OF WORK
13 MISCELLANEOUS PROVISIONS
14 TERMINATION OR SUSPENSION OF THE CONTRACT

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7.3.6.4, 9.6.7, 9.10.3, 11.4.9, 11.5
Building Permit
3.7.1
Capitalization
1.3
Certificate of Substantial Completion
9.8.3, 9.8.4, 9.8.5
Certificates for Payment
4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7.1, 9.10.1, 9.10.3, 13.7, 14.1.1.3, 14.2.4
Certificates of Inspection, Testing or Approval
13.5.4
Certificates of Insurance
9.10.2, 11.1.3
Change Orders
1.1.1, 2.4.1, 3.4.2, 3.8.2.3, 3.11.1, 3.12.8, 4.2.8, 4.3.4, 4.3.9, 5.2.3, 7.1, 7.2, 7.3, 8.3.1, 9.3.1.1, 9.10.3, 11.4.1.2, 11.4.4, 11.4.9, 12.1.2
Change Orders, Definition of
7.2.1
CHANGES IN THE WORK
3.11, 4.2.8, 7, 8.3.1, 9.3.1.1, 11.4.9
Claim, Definition of
4.3.1
Claims and Disputes
3.2.3, 4.3, 4.4, 4.5, 4.6, 6.1.1, 6.3, 7.3.8, 9.3.3, 9.10.4, 10.3.3
Claims and Timely Assertion of Claims
4.6.5
Claims for Additional Cost
3.2.3, 4.3.4, 4.3.5, 4.3.6, 6.1.1, 7.3.8, 10.3.2
Claims for Additional Time
3.2.3, 4.3.4, 4.3.7, 6.1.1, 8.3.2, 10.3.2
Claims for Concealed or Unknown Conditions
4.3.4
Claims for Damages
3.2.3, 3.18, 4.3.10, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.1.1, 11.4.5, 11.4.7, 14.1.3, 14.2.4
Claims Subject to Arbitration
4.1.1, 4.5.1, 4.6.1
Cleaning Up
3.15, 6.3
Commencement of Statutory Limitation Period
13.7
Commencement of the Work, Conditions Relating to
2.2.1, 3.2.1, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 4.3.5, 5.2.1, 5.2.3, 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.4.1, 11.4.6, 11.5.1
Commencement of the Work, Definition of
8.1.2
Communications Facilitating Contract Administration
3.9.1, 4.2.4
Completion, Conditions Relating to
1.6.1, 3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1, 9.10.2, 12.2, 13.7, 14.1.2
COMPLETION, PAYMENTS AND
9
Completion, Substantial
4.2.9, 8.1.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 9.10.4.2, 12.2, 13.7
Compliance with Laws
1.6.1, 3.2.2, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 4.4.8, 4.6.4, 4.6.6, 9.6.4, 10.2.2, 11.1, 11.4, 13.1, 13.4, 13.5.1, 13.5.2, 13.6, 14.1.1, 14.2.1.3
Concealed or Unknown Conditions
4.3.4, 8.3.1, 10.3
Conditions of the Contract
1.1.1, 1.1.7, 6.1.1, 6.1.4
Consent, Written
1.6, 3.4.2, 3.12.8, 3.14.2, 4.1.2, 4.3.4, 4.6.4, 9.3.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 11.4.1, 13.2, 13.4.2
CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
1.1.4, 6
Construction Change Directive, Definition of
7.3.1
Construction Change Directives
1.1.1, 3.12.8, 4.2.8, 4.3.9, 7.1, 7.3, 9.3.1.1
Construction Schedules, Contractor’s
1.4.1.2, 3.10, 3.12.1, 3.12.2, 4.3.7.2, 6.1.3
Contingent Assignment of Subcontracts
5.4, 14.2.2.2
Continuing Contract Performance
4.3.3
Contract, Definition of
1.1.2
CONTRACT, TERMINATION OR SUSPENSION OF THE
5.4.1.1, 11.4.9, 14
Contract Administration
3.1.3, 4, 9.4, 9.5
Contract Award and Execution, Conditions Relating to
3.7.1, 3.10, 5.2, 6.1, 11.1.3, 11.4.6, 11.5.1
Contract Documents, The
1.1, 1.2
Contract Documents, Copies Furnished and Use of
1.6, 2.2.5, 5.3
Contract Documents, Definition of
1.1.1
Contract Sum
3.8, 4.3.4, 4.3.5, 4.4.5, 5.2.3, 7.2, 7.3, 7.4, 9.1, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.4.1, 14.2.4, 14.3.2
Contract Sum, Definition of
9.1
Contract Time
4.3.4, 4.3.7, 4.4.5, 5.2.3, 7.2.1.3, 7.3, 7.4, 8.1.1, 8.2, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 14.3.2
Contract Time, Definition of
8.1.1
CONTRACTOR
3
Contractor, Definition of
Contractor’s Construction Schedules
1.4.1.2, 3.10, 3.12.1, 3.12.2, 4.3.7.2, 6.1.3
Contractor’s Employees
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.1.1, 11.4.7, 14.1, 14.2.1.1,
Contractor’s Liability Insurance
11.1
1.4.1.2, 3.18.1, 3.18.2, 5, 9.6.2, 9.6.7, 9.10.2, 11.4.1.2, 11.4.7, 11.4.8
Contractor’s Relationship with Separate Contractors and Owner’s Forces
3.12.5, 3.14.2, 4.2.4, 6, 11.4.7, 12.1.2, 12.2.4
Contractor’s Relationship with Subcontractors
1.2.2, 3.3.2, 3.18.2, 4.2.3, 4.2.6, 9.2, 9.3, 9.4,
9.5, 9.7, 9.9, 10.2.6, 10.3, 11.3, 11.4.7, 12,
13.4.2, 13.5
Contractor’s Representations
1.5.2, 3.5.1, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2
Contractor’s Responsibility for Those Performing the Work
3.3.2, 3.18, 4.2.3, 4.3.7, 5.3.1, 6.1.3, 6.2, 6.3, 9.5.1, 10
Contractor’s Review of Contract Documents
1.5.2, 3.2, 3.7.3
Contractor’s Right to Stop the Work
9.7
Contractor’s Right to Terminate the Contract
4.3.10, 14.1
Contractor’s Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.6, 9.2, 9.3,
9.8.2, 9.8.3, 9.9, 9.10.2, 9.10.3, 11.1.3, 11.5.2
Contractor’s Superintendent
3.9, 10.2
Contractor’s Supervision and Construction Procedures
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 4.3.3, 6.1.3,
6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12.14
Contractual Liability Insurance
11.1.1.8, 11.2, 11.3
Coordination and Correlation
1.2, 1.5.2, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1
Copies Furnished of Drawings and Specifications
1.6, 2.2.5, 3.11
Copyrights
1.6, 3.17
Correction of Work
2.3, 2.4, 3.7.4, 4.2.1, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2,
12.2, 13.7.1.3
Correlation and Intent of the Contract Documents
1.2
Cost, Definition of
7.3.6
Costs
2.4, 3.2.3, 3.7.4, 3.8.2, 3.15.2, 4.3, 5.4.2, 6.1.1, 6.2.3,
7.3.3.3, 7.3.6, 7.3.7, 7.3.8, 9.10.2, 10.3.2, 10.5, 11.3,
11.4, 12.1, 12.2.1, 12.2.4, 13.5, 14
Cutting and Patching
6.2.5, 3.14
Damage to Construction of Owner or Separate Contractors
3.14.2, 6.2.4, 9.2.1.5, 10.2.1.2, 10.2.5, 10.6, 11.1,
11.4, 12.2.4
Damage to the Work
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.6, 11.4, 12.2.4
Damages, Claims for
3.2.3, 3.18, 4.3.10, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3,
11.1.1, 11.4.5, 11.4.7, 14.1.3, 14.2.4
Damages for Delay
6.1.1, 8.3.3, 9.5.1.6, 9.7, 10.3.2
Date of Commencement of the Work, Definition of
8.1.2
Date of Substantial Completion, Definition of
8.1.3
Day, Definition of
8.1.4
Decisions of the Architect
4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.3.4, 4.4.1, 4.4.5,
4.4.6, 4.5, 6.3, 7.3.6, 7.3.8, 8.1.3, 8.3.1, 9.2, 9.4,
9.5.1, 9.8.4, 9.9.1, 13.5.2, 14.2.2, 14.2.4
Decisions to Withhold Certification
9.4.1, 9.5, 9.7, 14.1.1.3
Defective or Nonconforming Work, Acceptance, Rejection and Correction of
2.3, 2.4, 3.5.1, 4.2.6, 6.2.5, 9.5.1, 9.5.2, 9.6.6, 9.8.2,
9.9.3, 9.10.4, 12.2.1, 13.7.1.3
Defective Work, Definition of
3.5.1
Definitions
1.1, 2.1.1, 3.1, 3.5.1, 3.12.1, 3.12.2, 3.12.3, 4.1.1,
4.3.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 7.3.6, 8.1, 9.1, 9.8.1
Delays and Extensions of Time
3.2.3, 4.3.1, 4.3.4, 4.3.7, 4.4.5, 5.2.3, 7.2.1, 7.3.1,
8.1.2, 8.3, 9.5.1, 9.7.1, 10.3.2, 10.6.1, 14.3.2
Disputes
4.1.4, 4.3, 4.4, 4.5, 4.6, 6.3, 7.3.8
Documents and Samples at the Site
3.11
Drawings, Definition of
1.1.5
Drawings and Specifications, Use and Ownership of
1.1.1, 1.3, 2.2.5, 3.11, 5.3
Effective Date of Insurance
8.2.2, 11.1.2
Emergencies
4.3.5, 10.6, 14.1.1.2
Employees, Contractor’s
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3,
11.1.1, 11.4.7, 14.1, 14.2.1.1
Equipment, Labor, Materials and
1.1.3, 1.1.6, 3.4, 3.5.1, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.6, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.2
Execution and Progress of the Work
1.1.3, 1.2.1, 1.2.2, 2.2.3, 2.2.5, 3.1, 3.3, 3.4, 3.5, 3.7, 3.10, 3.12, 3.14, 4.2.2, 4.2.3, 4.3.3, 6.2.2, 7.1.3, 7.3.4, 8.2, 9.5, 9.9.1, 10.2, 10.3, 12.2, 14.2, 14.3
Extensions of Time
3.2.3, 4.3.1, 4.3.4, 4.3.7, 4.4.5, 5.2.3, 7.2.1, 7.3, 7.4.1, 9.5.1, 9.7.1, 10.3.2, 10.6.1, 14.3.2
Failure of Payment
4.3.6, 9.5.1.3, 9.7, 9.10.2, 14.1.1.3, 14.2.1.2, 13.6
Faulty Work
(See Defective or Nonconforming Work)
Final Completion and Final Payment
4.2.1, 4.2.9, 4.3.2, 9.8.2, 9.10, 11.1.2, 11.1.3, 11.4.1, 11.4.5, 12.3.1, 13.7, 14.2.4, 14.4.3
Financial Arrangements, Owner's
2.2.1, 13.2.2, 14.1.1.5
Finances
Insurance, Owner's Liability
11.2
Insurance, Project Management Protective Liability
11.3
Insurance, Property
10.2.5, 11.4
Insurance, Stored Materials
9.3.2, 11.4.1.4
INSURANCE AND BONDS
11
Insurance Companies, Consent to Partial Occupancy
9.9.1, 11.4.1.5
Insurance Companies, Settlement with
11.4.10
Intent of the Contract Documents
1.2.1, 4.2.7, 4.2.12, 4.2.13, 7.4
Interest
13.6
Interpretation
1.2.3, 1.4, 4.1.1, 4.3.1, 5.1, 6.1.2, 8.1.4
Interpretations, Written
4.2.11, 4.2.12, 4.3.6
Joinder and Consolidation of Claims Required
4.6.4
Judgment on Final Award
4.6.6
Labor and Materials, Equipment
1.1.3, 1.1.6, 3.4, 3.5.1, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 42.2, 4.2.7, 5.2.1, 6.2.1, 7.3.6, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.2
Labor Disputes
8.3.1
Laws and Regulations
1.6, 3.2.2, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 4.4.8, 4.6, 9.6.4, 9.9.1, 10.2.2, 11.1, 11.4, 13.1, 13.4, 13.5.1, 13.5.2, 13.6, 14
Liens
2.1.2, 4.4.8, 8.2.2, 9.3.3, 9.10
Limitation on Consolidation or Joinder
4.6.4
Limitations, Statutes of
4.6.3, 12.2.6, 13.7
Limitations of Liability
2.3, 3.2.1, 3.5.1, 3.7.3, 3.12.8, 3.12.10, 3.17, 3.18, 4.2.6, 4.2.7, 4.2.12, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.10.4, 10.3.3, 10.2.5, 11.1.2, 11.2.1, 11.4.7, 12.2.5, 13.4.2
Limitations of Time
2.1.2, 2.2, 2.4, 3.2.1, 3.7.3, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7, 4.3, 4.4, 4.5, 4.6, 5.2.5, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 11.1.3, 11.4.1.5, 11.4.6, 11.4.10, 12.2, 13.5, 13.7, 14
Loss of Use Insurance
11.4.3
Material Suppliers
5
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1.6, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.6, 9.10.5
Materials, Hazardous
10.2.4, 10.3, 10.5
Materials, Labor, Equipment and
1.1.3, 1.1.6, 1.6.1, 3.4, 3.5.1, 3.8.2, 3.8.23, 3.12, 3.13,
3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.6, 9.3.2, 9.3.3,
9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.2
Means, Methods, Techniques, Sequences and
Procedures of Construction
3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.3.2, 9.3.3
Mechanic’s Lien
4.4.8
Mediation
4.4.1, 4.4.5, 4.4.6, 4.5, 4.6.1, 4.6.2, 8.3.1, 10.5
Minor Changes in the Work
1.1.1, 3.12.8, 4.2.8, 4.3.6, 7.1, 7.4
MISCELLANEOUS PROVISIONS
13
Modifications, Definition of
1.1.1
Modifications to the Contract
1.1.1, 1.1.2, 3.7.3, 3.11, 4.1.2, 5.2.3, 7, 8.3.1,
9.7, 10.3.2, 11.4.1
Mutual Responsibility
6.2
Nonconforming Work, Acceptance of
9.6.6, 9.9.3, 12.3
Nonconforming Work, Rejection and Correction of
2.3, 2.4, 3.5.1, 4.2.6, 6.2.5, 9.5.1, 9.8.2, 9.9.3, 9.10.4,
12.2.1, 13.7.1.3
Notice
2.2.1, 2.3, 2.4, 3.2.3, 3.3.1, 3.7.2, 3.7.4, 3.12.9, 4.3,
4.4.8, 4.6.5, 5.2.1, 8.2.2, 9.7, 9.10, 10.2.2, 11.1.3,
11.4.6, 12.2.2, 12.2.4, 13.3, 13.5.1, 13.5.2, 14.1, 14.2
Notice, Written
2.3, 2.4, 3.3.1, 3.9, 3.12.9, 3.12.10, 4.3, 4.4.8, 4.6.5,
5.2.1, 8.2.2, 9.7, 9.10, 10.2.2, 10.3, 11.1.3, 11.4.6,
12.2.2, 12.2.4, 13.3, 14
Notice of Testing and Inspections
13.5.1, 13.5.2
Notice to Proceed
8.2.2
Notices, Permits, Fees and
2.2.2, 3.7, 3.13, 7.3.6.4, 10.2.2
Observations, Contractor’s
1.5.2, 3.2, 3.7.3, 4.3.4
Occupancy
2.2.2, 9.6.6, 9.8, 11.4.1.5
Orders, Written
1.1.1, 2.3, 3.9, 4.3.6, 7, 8.2.2, 11.4.9, 12.1, 12.2,
13.5.2, 14.3.1
OWNER
2
Owner, Definition of
2.1
Owner, Information and Services Required of the
2.1.2, 2.2, 3.2.1, 3.12.4, 3.12.10, 4.2.7, 4.3.3, 6.1.3,
6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3,
11.2, 11.4, 13.5.1, 13.5.2, 14.1.1.4, 14.1.4
Owner’s Authority
1.6, 2.1.1, 2.3, 2.4, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2,
4.1.3, 4.2.4, 4.2.9, 4.3.6, 4.4.7, 5.2.1, 5.2.4, 5.4.1,
6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.1, 9.3.2, 9.5.1,
9.9.1, 9.10.2, 10.3.2, 11.1.3, 11.3.1, 11.4.3, 11.4.10,
12.2.2, 13.3.1, 13.3.2, 14.3, 14.4
Owner’s Financial Capability
2.2.1, 13.2.2, 14.1.1.5
Owner’s Liability Insurance
11.2
Owner’s Loss of Use Insurance
11.4.3
Owner’s Relationship with Subcontractors
1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2
Owner’s Right to Carry Out the Work
2.4, 12.2.4, 14.2.2.2
Owner’s Right to Clean Up
6.3
Owner’s Right to Perform Construction and to
Award Separate Contracts
6.1
Owner’s Right to Stop the Work
2.3
Owner’s Right to Suspend the Work
14.3
Owner’s Right to Terminate the Contract
14.2
Ownership and Use of Drawings, Specifications
and Other Instruments of Service
1.1.1, 1.6, 2.2.5, 3.2.1, 3.11.1, 3.17.1, 4.2.12, 5.3
Partial Occupancy or Use
9.6.6, 9.9, 11.4.1.5
Patching, Cutting and
3.14, 6.2.5
Patents
3.17
Payment, Applications for
4.2.5, 7.3.8, 9.2, 9.3, 9.4, 9.5.1, 9.6.3, 9.7.1, 9.8.5,
9.10.1, 9.10.3, 9.10.5, 11.1.3, 14.2.4, 14.4.3
Payment, Certificates for
4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7.1, 9.10.1,
9.10.3, 13.7, 14.1.1.3, 14.2.4
Payment, Failure of
4.3.6, 9.5.1.3, 9.7, 9.10.2, 14.1.1.3, 14.2.1.2, 13.6
Payment, Final
4.2.1, 4.2.9, 4.3.2, 9.8.2, 9.10, 11.1.2, 11.1.3, 11.4.1,
11.4.5, 12.3.1, 13.7, 14.2.4, 14.4.3
Payment Bond, Performance Bond and
7.3.6.4, 9.6.7, 9.10.3, 11.4.9, 11.5
Payments, Progress
4.3.3, 9.3, 9.6, 9.8.5, 9.10.3, 13.6, 14.2.3
PAYMENTS AND COMPLETION
9
Payments to Subcontractors
6.2.1, 9.3.2, 10.2.1.2, 10.2.4, 11.4.1.4
Subcontractor, Definition of
5.1.1

SUBCONTRACTORS
5
Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7

Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1.1, 11.4.7, 11.4.8, 14.1, 14.2.1, 14.3.2

Submittals
1.6, 3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.6, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3, 11.1.3

Subrogation, Waivers of
6.1.1, 11.4.5, 11.4.7

Substantial Completion
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 9.10.4.2, 12.2, 13.7
Substantial Completion, Definition of
9.8.1
Substitution of Subcontractors
5.2.3, 5.2.4
Substitution of Architect/Designer
4.1.3
Substitutions of Materials
3.4.2, 3.5.1, 7.3.7
Sub-subcontractor, Definition of
5.1.2
Subsurface Conditions
4.3.4

Successors and Assigns
13.2

Superintendent
3.9, 10.2.6

Supervision and Construction Procedures
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 4.3.3, 6.1.3, 6.2.4, 7.1.3, 7.3.6, 8.2, 8.3.1, 9.4.2, 10, 12, 14
Surety
4.4.7, 5.4.1.2, 9.8.5, 9.10.2, 9.10.3, 14.2.2
Surety, Consent of
9.10.2, 9.10.3
Surveys
2.2.3

Suspension by the Owner for Convenience
14.4
Suspension of the Work
5.4.2, 14.3
Suspension or Termination of the Contract
4.3.6, 5.4.1.1, 11.4.9, 14

Taxes
3.6, 3.8.2.1, 7.3.6.4

Termination by the Contractor
4.3.10, 14.1

Termination by the Owner for Cause
4.3.10, 5.4.1.1, 14.2

Termination of the Architect/Designer

4.1.3
Termination of the Contractor
14.2.2

TERMINATION OR SUSPENSION OF THE CONTRACT
14

Tests and Inspections
3.1.3, 3.3.3, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 11.4.1.1, 12.2.1, 13.5

TIME
8

Time, Delays and Extensions of
3.2.3, 4.3.1, 4.3.4, 4.3.7, 4.4.5, 5.2.3, 7.2.1, 7.3.1, 7.4.1, 8.3, 9.5.1, 9.7.1, 10.3.2, 10.6.1, 14.3.2
Time Limits
2.1.2, 2.2, 2.4, 3.2.1, 3.7.3, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 4.3, 4.4, 4.5, 4.6, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 11.1.3, 11.4.1.5, 11.4.6, 11.4.10, 12.2, 13.5, 13.7, 14

Time Limits on Claims
4.3.2, 4.3.4, 4.3.8, 4.4, 4.5, 4.6

Title to Work
9.3.2, 9.3.3

UNCOVERING AND CORRECTION OF WORK
12
Uncovering of Work
12.1
Unforeseen Conditions
4.3.4, 8.3.1, 10.3

Unit Prices
4.3.9, 7.3.3.2

Use of Documents
1.1.1, 1.6, 2.2.5, 3.12.6, 5.3

Use of Site
3.13, 6.1.1, 6.2.1

Values, Schedule of
9.2, 9.3.1

Waiver of Claims by the Architect/Designer
13.4.2

Waiver of Claims by the Contractor
4.3.10, 9.10.5, 11.4.7, 13.4.2

Waiver of Claims by the Owner
4.3.10, 9.9.3, 9.10.3, 9.10.4, 11.4.3, 11.4.5, 11.4.7, 12.2.2.1, 13.4.2, 14.2.4

Waiver of Consequential Damages
4.3.10, 14.2.4

Waiver of Liens
9.10.2, 9.10.4

Waivers of Subrogation
6.1.1, 11.4.5, 11.4.7

Warranty
3.5, 4.2.9, 4.3.5.3, 9.3.3, 9.8.4, 9.9.1, 9.10.4, 12.2.2, 13.7.1.3

Weather Delays
4.3.7.2
Work, Definition of
1.1.3
Written Consent
1.6, 3.4.2, 3.12.8, 3.14.2, 4.1.2, 4.3.4, 4.6.4, 9.3.2,
9.8.5, 9.9.1, 9.10.2, 9.10.3, 11.4.1, 13.2, 13.4.2
Written Interpretations
4.2.11, 4.2.12, 4.3.6

Written Notice
2.3, 2.4, 3.3.1, 3.9, 3.12.9, 3.12.10, 4.3, 4.4.8, 4.6.5,
5.2.1, 8.2.2, 9.7, 9.10, 10.2.2, 10.3, 11.1.3, 11.4.6,
12.2.2, 12.2.4, 13.3, 14
Written Orders
1.1.1, 2.3, 3.9, 4.3.6, 7, 8.2.2, 11.4.9, 12.1, 12.2,
13.5.2, 14.3.1
ARTICLE 1  GENERAL PROVISIONS
§ 1.1 BASIC DEFINITIONS
§ 1.1.1 THE CONTRACT DOCUMENTS
The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor’s bid or portions of Addenda relating to bidding requirements).

§ 1.1.2 THE CONTRACT
The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Architect and Contractor, (2) between the Owner and a Subcontractor or Sub-subcontractor, (3) between the Owner and Architect or (4) between any persons or entities other than the Owner and Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect’s duties.

§ 1.1.3 THE WORK
The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT
The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

§ 1.1.5 THE DRAWINGS
The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS
The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 THE PROJECT MANUAL
The Project Manual is a volume or set assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications, Contract, schedules, tables, drawings, and Specifications.

§ 1.1.8 PROVIDE OR PROVIDED:
"Provide" or "Provided" as used in Contract Documents includes furnishing and installing a thing, product, system or the like.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS
§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.
§ 1.2.3 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 Within the Specifications, the sections of Division One (01) are General Requirements, and apply to all sections of the Specifications.

§ 1.3 CAPITALIZATION

§ 1.3.1 Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects-Designers.

§ 1.4 INTERPRETATION

§ 1.4.1 In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 EXECUTION OF CONTRACT DOCUMENTS

§ 1.5.1 The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect-Designer shall identify such unsigned Documents upon request.

§ 1.5.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

§ 1.6.1 The Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect-Designer and the Architect’s Designer’s consultants are Instruments of Service Documents through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect-Designer or the Architect-Designer’s consultants, and unless otherwise indicated the Architect-Designer and the Architect-Designer’s consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved rights, in addition to the copyrights. All copies of Instruments of Service, them. All copies of Documents, except the Contractor’s record set, shall be returned or suitably accounted for to the Architect-Designer, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect-Designer and the Architect’s Designer’s consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect-Designer and the Architect’s Designer’s consultants. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect Designer and the Architect’s Designer’s consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect-Designer and the Architect’s Designer’s consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect’s or Architect’s Designer’s or Designer’s consultants’ copyrights or other reserved rights.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number, State of Tennessee. The Owner shall designate in writing a
§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 The Owner shall, at the written request of the Contractor, prior to commencement of the Work and thereafter, furnish to the Contractor reasonable evidence that financial arrangements have been made to fulfill the Owner’s obligations under the Contract. Furnishing of such evidence shall be a condition precedent to commencement or continuation of the Work. After such evidence has been furnished, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor. The Owner’s project number constitutes verification that funding has been established as a matter of public record.

§ 2.2.2 Except for permits and fees, including those required under Section 3.7.1, which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 Information or services required of the Owner by the Contract Documents shall be furnished by the Owner with reasonable promptness. Any other information or services relevant to the Contractor’s performance of the Work under the Owner’s control shall be furnished by the Owner after receipt from the Contractor of a written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

§ 2.3 OWNER’S RIGHT TO STOP THE WORK

§ 2.3.1 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or persistently fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER’S RIGHT TO CARRY OUT THE WORK

§ 2.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such seven day period give the Contractor a second written notice to correct such deficiencies within a three day period. If the Contractor within
such three-day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall Work in accordance with Contract Documents or fails to fulfill requirements of Contract, then Owner may, after ten (10) days written notice to Contractor and without prejudice to any other remedy that Owner may have, make good such deficiencies. In such case, appropriate modification will be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner’s expenses and compensation for the Architect’s costs of Designer’s additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect—neglect, or failure. Designer will approved both such action and the amount charged to Contractor. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR
§ 3.1 GENERAL
§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor’s authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect-Designer in the Architect-Designer’s administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

§ 3.1.4 At the time of bid and award, Contractor shall not be currently disqualified from participating in State construction projects under the supervision of the State Building Commission. Such disqualification extends to succeeding or related corporations, partnerships, joint ventures, and other business organizations having substantial factual or legal connections, continuity, or identity with those that have been disqualified.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR
§ 3.2.1 Since the Contract Documents are complementary, before starting each portion of the Work, the Contractor shall carefully study and compare the various Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the Architect-Designer as a request for information in such form as the Architect-Designer may require.

§ 3.2.2 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect-Designer, but it is recognized that the Contractor’s review is made in the Contractor’s capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity discovered by or made known to the Contractor shall be reported promptly to the Architect-Designer.

§ 3.2.3 If the Contractor believes that additional cost or time is involved because of clarifications or instructions issued by the Architect-Designer in response to the Contractor’s notices or requests for information pursuant to Sections 3.2.1 and 3.2.2, the Contractor shall make Claims as provided in Sections 4.3.6 and 4.3.7. If the Contractor fails to perform the obligations of Sections 3.2.1 and 3.2.2, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. The Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents or for differences between field measurements or conditions and the Contract Documents unless the Contractor recognized such error, inconsistency, omission or difference and knowingly failed to report it to the Architect-Owner or Designer for damage resulting from error, inconsistency, or omission in Contract Documents, unless Contractor discovered, or in the exercise of reasonable diligence should have discovered such error.
§ 3.4.3 Contractor has in proposed subcontractors and material suppliers. manufacturers must conform to such requirements. Documents, in which case neither Contract Sum nor Contract Time shall be adjusted. Failure to object to a change unless objection was based on failure of manufacturer or installer to meet requirements of Contract provides further data. Contractor shall not make use of a manufacturer, or installer to which Owner or Designer has § 3.4.2 Designer, after due investigation, has reasonable objection to any such manufacturer or installer. If adequate data on subcontractor. Designer will within fourteen (14) days reply in writing to Contractor stating whether Owner or names of manufacturers proposed for each specified product, and applicable name of installer, whether Contractor or Owner will be final judge of acceptability of substitution. No substitution shall be made without authority in writing approval in writing and shall submit samples and data as required for Designer’s consideration. Designer and Contractor shall supervise and direct the Work, using the Contractor’s best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice and a proposal of corrective changes to the Owner and Architect Designer and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any resulting loss or damage. Designer.

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Contractor shall not receive material nor labor from one who submitted a competing general bid for the same Contract and subsequently withdrew, reneged, or otherwise failed to enter into contract.

§ 3.4.2 The Contractor shall make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order. Specified materials, equipment, and systems are essential elements of the Contract. If Contractor desires to use another material, equipment, or system in lieu thereof, Contractor shall request approval in writing and shall submit samples and data as required for Designer’s consideration. Designer and Owner will be final judge of acceptability of substitution. No substitution shall be made without authority in writing from Designer. Not later than twenty-one (21) days after award of contract, Contractor shall provide a list showing names of manufacturers proposed for each specified product, and applicable name of installer, whether Contractor or subcontractor. Designer will within fourteen (14) days reply in writing to Contractor stating whether Owner or Designer, after due investigation, has reasonable objection to any such manufacturer or installer. If adequate data on proposed manufacturer or installer is not available, Designer may state that action will be deferred until Contractor provides further data. Contractor shall not make use of a manufacturer, or installer to which Owner or Designer has reasonably objected. Contractor will receive adjustment in Contract Sum, Contract Time, or both for making such change unless objection was based on failure of manufacturer or installer to meet requirements of Contract Documents, in which case neither Contract Sum nor Contract Time shall be adjusted. Failure to object to a manufacturer shall not constitute waiver of requirements of Contract Documents. Products furnished by listed manufacturers must conform to such requirements.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor’s employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

§ 3.4.4 Contractor shall disclose existence and extent of financial interests, whether direct or indirect, which Contractor has in proposed subcontractors and material suppliers.

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§ 3.4.5 NON-DISCRIMINATION IN EMPLOYMENT:
§ 3.4.5.1 Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, religion, sex, age, or national origin as defined in Tennessee Code Annotated (TCA) §4-21-401, et seq., nor because of handicap, in accordance with TCA § 8-50-103.

§ 3.4.5.2 Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to handicap, race, creed, color, religion, sex, age, or national origin, including but not limited to practices in recruitment, recruitment advertising, employment, selection for training or apprenticeship, rates of pay or other forms of compensation, upgrading, demotion, transfer, layoff, or termination.

§ 3.4.5.3 Contractor shall post in conspicuous places, available to employees and applicants for employment, notices setting forth these policies of non-discrimination.

§ 3.4.5.4 Solicitations or advertisements for employees placed by or in behalf of Contractor shall state that qualified applicants shall receive consideration for employment without regard to handicap, race, creed, color, religion, sex, age, or national origin.

§ 3.4.6 PREVAILING WAGE SCALE
§ 3.4.6.1 Contractor is required to comply with policies, conditions and rules of the Tennessee Department of Labor pursuant to TCA §12-4-401, et seq, which include that if the Contract Sum exceeds fifty thousand dollars ($50,000.00), Contractor is required to pay Prevailing Wage Scale current in the area of the project to laborers and mechanics employed on the Work, as set forth in said rules, policies, and statute, and to furnish weekly payrolls with the decision number noted on each to the Tennessee Department of Labor.

§ 3.4.6.2 When a Federal Wage Scale will apply to the Project, it will be included in Contract Documents, and Contractor shall pay not less than rates set forth. If both federal and State wage rates apply to project, Contractor shall pay the higher of the two wage scales for each craft or trade.

§ 3.4.6.3 Current Prevailing Wage Scale Determination(s) for this project will have been bound herein, after the Supplementary Conditions, or issued by addendum, if Owner’s estimate of the value of Work indicates that it is required. Failure of Owner or Designer to provide current wage scale decision prior to bidding does not relieve Contractor of obligations set forth above.

§ 3.4.6.4 If applicability or values of Prevailing Wage Rates applicable to the project change during the course of the Contract, or differ from those provided in Contract Documents, equitable adjustment in Contract Sum shall be made.

§ 3.4.7 PROHIBITION OF ILLEGAL IMMIGRANTS
§ 3.4.7.1 The requirements of Public Acts of 2006, Chapter Number 878, of the State of Tennessee, addressing the use of illegal immigrants in the performance of any contract to supply goods or services to the State of Tennessee, shall be a material provision of this Contract, a breach of which shall be grounds for monetary and other penalties, up to and including termination of this Contract.

§ 3.4.7.2 The Contractor hereby attests, certifies, warrants, and assures that the Contractor shall not knowingly utilize the services of an illegal immigrant in the performance of this Contract and shall not knowingly utilize the services of any subcontractor who will utilize the services of any illegal immigrant in the performance of this Contract. The Contractor shall reaffirm this attestation, in writing, by submitting to the Owner a completed and signed copy of the standard form entitled "Personnel Used in Contract Performance" with each application for payment. This form is provided in the Contract Documents. Such attestations shall be maintained by the Contractor and made available to state officials upon request.

§ 3.4.7.3 Prior to the use of any subcontractor in the performance of this Contract, and semi-annually thereafter, during the period of this Contract, the Contractor shall obtain and retain a current, written attestation that the subcontractor shall not knowingly utilize the services of an illegal immigrant to perform work relative to this Contract and shall not knowingly utilize the services of any subcontractor who will utilize the services of an illegal immigrant to perform work relative to this Contract. Attestations obtained from such subcontractors shall be maintained by the Contractor and made available to state officials upon request.
§ 3.4.7.4 The Contractor shall maintain records for all personnel used in the performance of this Contract. Said
records shall be subject to review and random inspection at any reasonable time upon reasonable notice by the
Owner.

§ 3.4.7.5 The Contractor understands and agrees that failure to comply with this section will be subject to the
sanctions of Public Chapter 878 of 2006 for acts or omissions occurring after its effective date. This law requires the
Commissioner of Finance and Administration to prohibit a Contractor from contracting with, or submitting an offer,
proposal, or bid to contract with the State of Tennessee to supply goods or services for a period of one year after a
Contractor is discovered to have knowingly used the services of illegal immigrants during the performance of this
Contract.

§ 3.4.7.6 For purposes of this Contract, "illegal immigrant" shall be defined as any person who is not either a United
States citizen, a Lawful Permanent Resident, or a person whose physical presence in the United States is authorized
or allowed by the Department of Homeland Security and who, under Federal immigration laws and/or regulations, is
authorized to be employed in the U.S. or is otherwise authorized to provide services under the Contract.

§ 3.4.8 REPORTING OF SUBCONTRACTORS

§ 3.4.8.1 If the total Contract Sum equals or exceeds $100,000 (whether under the terms of the original contract or
by Amendment), and the time of performance is more than six (6) months, Contractor shall fully comply with its
obligations under Tennessee Code Annotated 50-7-404(g) including but not limited to the subcontractor reporting
requirements of subsection (g)(1).

§ 3.5 WARRANTY

§ 3.5.1 The Contractor warrants to the Owner and Architect-Designer that materials and equipment furnished under
the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that
the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform
to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions
not properly approved and authorized, may be considered defective. The Contractor’s warranty excludes remedy for
damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient
maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect-
Designer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

§ 3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor
which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely
scheduled to go into effect.

§ 3.6.2 Subparagraph 3.6.1 notwithstanding, if after bids are received or negotiations concluded, the State of
Tennessee enacts a change in a sales, consumer, use, or similar state tax for the Work or a portion thereof provided
by the Contractor, the Contract Sum shall be accordingly adjusted by appropriate modification or the Owner may
make other lawful provision to mitigate the change.

§ 3.6.3 Neither Contract Sum nor Contract Time shall be adjusted for impacts resulting from a change in a tax by a
governmental body other than the State of Tennessee, regardless of when the tax is enacted or goes into effect.

§ 3.7 PERMITS, FEES AND NOTICES

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building
permit and other permits and governmental fees, licenses and inspections necessary for proper execution and
completion of the Work which are customarily secured after execution of the Contract and which are legally
required when bids are received or negotiations concluded.

§ 3.7.2 Except as provided in subparagraph 3.7.5, the Contractor shall comply with and give notices required by
laws, ordinances, rules, regulations and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 Except as provided in subparagraph 3.7.5, it is not the Contractor’s responsibility to ascertain that the
Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and
regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith,
§ 3.7.4 If except as provided in subparagraph 3.7.5, if the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and Owner, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.5 This subparagraph applies to any applicable local governmental permit. The Owner is an agency of state government, and as such has sovereign immunity from the laws, ordinances, rules, regulations and lawful orders of local governments within the state; however, the Contractor shall obtain all normal permits whenever possible as if the Owner had no such immunity. If a delay or denial in securing a local permit occurs, the Contractor shall inform the Designer and the Owner of the situation, propose corrective measures, continue to pursue the customary permits, and continue the Work upon approval of the Designer.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor’s costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances;

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor’s costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner in sufficient time to avoid delay in the Work.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ and designate a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. Contractor shall not change such designation without consent of Owner; and, Owner’s consent shall not be unreasonably withheld. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

§ 3.10 CONTRACTOR’S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner’s and Architect’s information a Contractor’s construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare and keep current, for the Architect’s approval, a schedule of submittals which is coordinated with the Contractor’s construction schedule and allows the Architect reasonable time to review submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.
§ 3.10.4 SCHEDULING AGENT
At any time during the course of the Work, Owner may provide the services of a Construction Scheduling Agent. If provided, such services will be set forth in the specification of Progress Schedules. If provided, the purpose of such services is to assist in producing a progress schedule for the Work; however, no express or implied guarantee or warranty is provided by the Owner regarding the suitability of the derived schedules, and the Contractor retains full responsibility for the suitability of the schedules and for conforming to them. Contractor shall cooperate fully in developing a schedule, and shall require the necessary forces assisting the Contractor to likewise cooperate fully.

§ 3.10.5 COMMISSIONING AGENT
At any time during the course of the Work, Owner may utilize the services of a Commissioning Agent to have selected building systems commissioned. If utilized, such services and systems will be set forth in the specifications of Commissioning Requirements. If utilized, the purpose of such services is to ensure that all building systems perform interactively according to the design intent as indicated by the Contract Documents and the Owner’s operational needs. The Commissioning Agent will direct the commissioning process. Contractor shall cooperate fully in the commissioning process, and shall require the necessary forces assisting the Contractor to likewise cooperate fully.

§ 3.10.6 HAZARDOUS MATERIALS AGENT
At any time during the course of the Work, Owner may utilize the services of a Hazardous Materials Agent to perform assessment of possible hazardous materials encountered by the Contractor in performance of the Work. If utilized, such services will be set forth in the specifications of Hazardous Materials Assessment Requirements. If utilized, the purpose of such services is to determine the appropriate course of action to contend with such materials in accordance with the Contract Documents. Contractor shall cooperate fully in the assessment process, and shall require the necessary forces assisting the Contractor to likewise cooperate fully.

§ 3.10.7 DISASTER RECOVERY AGENT
At any time during the course of the Work, Owner may utilize the services of a Disaster Recovery Agent to perform emergency disaster recovery services at the project site relating to Contractor performance of the Work, or other circumstances. Time being of the essence, such work will be to mitigate material damages that has occurred with the intent to lessen costs potentially to the Contractor and Owner. Contractor shall cooperate fully in the disaster recovery process, and shall require the necessary forces assisting the Contractor to likewise cooperate fully.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE
§ 3.11.1 The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record field changes and selections made during construction, and one record copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect Designer and shall be delivered to the Architect Designer for submittal to the Owner upon completion of the Work.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Architect Designer is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect Designer is not expected to take responsive action may be so identified in the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect Designer without action.
§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect-Designer Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect-Designer without action.

§ 3.12.6 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, prior to providing that which is the subject of the submittal and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 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 approved by the Architect-Designer.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect’s Designer’s approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect-Designer in writing of such deviation at the time of submittal and (1) the Architect-Designer has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect’s Designer’s approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect-Designer on previous submittals. In the absence of such written notice the Architect’s Designer’s approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor’s responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect-Designer will specify all performance and design criteria related thereto, or will do so, prior to providing that which is the subject of the submittal and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional’s written approval when submitted to the Architect-Designer. The Contractor shall not be relieved of responsibility for the adequacy of the performance or design criteria specified by the Architect-Designer.

§ 3.13 USE OF SITE
§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.
§ 3.14 CUTTING AND PATCHING
§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor’s consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP
§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor’s tools, construction equipment, machinery and surplus materials.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

§ 3.16 ACCESS TO WORK
§ 3.16.1 The Contractor shall provide the Owner and Architect-Designer access to the Work in preparation and progress wherever located, so that each may perform functions and exercise rights under the Contract Documents.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS
§ 3.17.1 The Contractor shall pay all royalties and license fees. The Contractor shall, subject to approval by the Attorney General of the State of Tennessee with respect to suits or claims against Owner, defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect-Designer harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect-Designer. However, if the Contractor knows or has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect-Designer.

§ 3.18 INDEMNIFICATION
§ 3.18.1 To the fullest extent permitted by law and to the extent claims, damages, losses or expenses are not covered by Project Management Protective Liability insurance purchased by the Contractor in accordance with Section 11.4, law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect’s Designer, Designer’s consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), property, including loss of use resulting therefrom, but only to the extent caused by willful or the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers’ compensation acts, disability benefit acts or other employee benefit acts.

§ 3.19 RELATIONS WITH OWNER’S REPRESENTATIVES
§ 3.20 PARTICIPATION OF MINORITY-DIVERSITY OWNED BUSINESSES
§ 3.20.1 To the extent that the Contractor or a subcontractor is a Minority-Diversity-owned Business, the Contractor shall report to the State its own status in this regard and the names and amounts of contracts entered into with minority diversity-owned businesses on State projects in order for the State to collect data on such participation.

§ 3.20.2 "Minority-Diversity-owned Business" means a business which is solely owned, or at least fifty-one percent (51%) of the assets of outstanding stock of which is owned, by an individual who personally manages and controls the daily operations of such business, and who is impeded from normal entry into the economic mainstream because of past practices of discrimination based on race, religion, ethnic background, sex, or disability.

§ 3.20.3 To be a "Minority-Diversity-owned Business" for the purposes of this contract, a business must be certified as a "Minority-Diversity-owned Business" by an agency of the federal government or the government of the State of Tennessee which is normally engaged in the practice of providing such certification.

ARTICLE 4 ADMINISTRATION OF THE CONTRACT
§ 4.1 ARCHITECT
§ 4.1.1 The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect’s authorized representative.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a new Architect against whom the Contractor has no reasonable objection and Designer whose status under the Contract Documents shall be that of the former Architect.

§ 4.2 ARCHITECT’S ADMINISTRATION OF THE CONTRACT
§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents, and will be an Owner’s representative (1) during construction, (2) until final payment is due and (3) with the Owner’s concurrence, from time to time at the Owner’s request during the one-year period for correction of Work described in Section 12.2. The Owner, Designer and Contractor will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.
§ 4.2.2 The Architect, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor’s operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these all of which are solely the Contractor’s rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 The Architect will not be responsible for the Contractor’s failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect’s consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner or the Owner’s designee.

§ 4.2.5 Based on the Architect’s evaluations of the Contractor’s Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect will have authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve or take other appropriate action upon the Contractor’s submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given in the design concept expressed in the Contract Documents. The Architect’s review of the Data, and Samples, checking for compliance with the requirements of, and conformance with the intent of, the Contract Documents. The Designer’s action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Architect’s professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect’s review of the Contractor’s submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect’s review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect’s approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will help the Owner prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner, for the Owner’s review and records, written communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner or the Owner’s designee.
warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final
Certificate for Payment upon compliance with the requirements of the Contract Documents.

§ 4.2.10 If the Owner and Architect-Designer agree, the Architect-Designer will provide one or more project
representatives to assist in carrying out the Architect-Designer’s responsibilities at the site. The duties,
responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be
incorporated in the Contract Documents if requested by the Contractor.

§ 4.2.11 The Architect-Designer will interpret and decide matters concerning performance under and requirements of,
the Contract Documents on written request of either the Owner or Contractor. The Architect-Designer’s
response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable
promptness. If no agreement is made concerning the time within which interpretations required of the Architect-
Designer shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of
failure by the Architect-Designer to furnish such interpretations until 15 days after written request is made for them.

§ 4.2.12 Interpretations and decisions of the Architect-Designer will be consistent with the intent of and reasonably
inferable from the Contract Documents and will be in writing or in the form of drawings. When making such
interpretations and initial decisions, the Architect-Designer will endeavor to secure faithful performance by both
Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or
decisions so rendered in good faith, accordance with a reasonable and professional standard of care.

§ 4.2.13 The Architect-Designer’s decisions on matters relating to aesthetic effect will be final if consistent with the
intent expressed in the Contract Documents.

§ 4.3 CLAIMS AND DISPUTES

§ 4.3.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or
interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the
Contract. The term “Claim” also includes other disputes and matters in question between the Owner and Contractor
arising out of or relating to the Contract. Claims must be initiated by written notice. The responsibility to
substantiate Claims shall rest with the party making the Claim.

§ 4.3.2 Time Limits on Claims. Claims by either party, except claims of Liquidated Damages, must be
initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant
first recognizes the condition giving rise to the Claim, whichever is later. If the impact of the condition giving rise
to the Claim cannot be fully evaluated, a preliminary notice of a pending claim shall be made within the stated time
limit subject to further action in a timely manner. Claims must be initiated by written notice to the Architect-
Designer and the other party.

§ 4.3.3 Continuing Contract Performance. Pending final resolution of a Claim except as otherwise agreed in writing
or as provided in Section 9.2.1 and Article 14, the Contractor shall proceed diligently with performance of the
Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 4.3.4 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1)
subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract
Documents, excavations and other subsurface construction activity shall be considered unclassified down to design depth, regardless of substrate and abandoned or inactive infrastructures or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect-Designer will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor’s cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect-Designer determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect-Designer shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect-Designer has given notice of the decision. If the conditions encountered are...
materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Section 4.4.

§ 4.3.5 Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work, required by the Contract Documents shall be given to the Owner by the Contractor, and written notice received by the Contractor from Owner acknowledging the claim and authorizing construction activity to proceed, before the Contractor shall proceed to execute the construction activity giving rise to the claim; thence, the claim shall be addressed under provisions of paragraph 4.4. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.6. Documentation of claims shall conform to the requirements of Article 7.

§ 4.3.6 If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner’s suspension or (7) other reasonable grounds, Claim shall be filed in accordance with this Section 4.3.

§ 4.3.7 Claims for Additional Time

§ 4.3.7.1 If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor’s Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. To make claim for an increase in Contract Time, Contractor shall give written notice as provided herein, and include an estimate of cost, which shall be limited to that allowed by 8.3.3, and an explanation of the cause and probable effect on progress of Work. In the case of a continuing delay only one Claim is necessary, delay, only one claim is necessary, and Contractor shall subsequently detail the full scope of the delay.

§ 4.3.7.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 4.3.8 Injury or Damage to Person or Property. If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts any party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 4.3.9 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted subject to limitations and requirements contained in the Contract Documents.

§ 4.3.10 Claims for Consequential Damages. The Contractor and Owner waive Claims against each other, waivers claim against the Owner for consequential damages arising out of or relating to this Contract. This mutual waiver includes:

1. damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

2. damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business, Contract due to either party’s termination in accordance with Article 14, including principal office expenses, the compensation of personnel stationed at the principal office, and any damages for losses of financing, business, and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party’s termination in accordance with Article 14. Nothing contained in this Section 4.3.10 shall be deemed to preclude the award of liquidated direct damages, when applicable, in accordance with the requirements of the Contract Documents.
§ 4.4 RESOLUTION OF CLAIMS AND DISPUTES

§ 4.4.1 Decision of Architect—Designer. Claims, including those alleging an error or omission by the Architect but excluding those arising under Sections 10.3 through 10.5, Designer shall be referred initially to the Architect-Designer for decision. An initial decision by the Architect-Designer shall be required as a condition precedent to mediation, arbitration or litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered by the Architect. The Architect will not decide disputes between the Contractor and persons or entities other than the Owner action pursuant to remedies provided by law for claims between Owner and Contractor.

§ 4.4.2 The Architect-Designer will review Claims and within ten days of the receipt of the Claim or information preliminary or pursuant to a Claim or a modification to a Claim, and shall take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Architect-Designer is unable to resolve the Claim if the Architect-Designer lacks sufficient information to evaluate the merits of the Claim or if the Architect-Designer concludes that, in the Architect’s-Designer sole discretion, it would be inappropriate for the Architect to resolve the Claim. Designer will either reject or approve the Claim in whole or in part. Designer will render a decision. The Architect-Designer may request the Owner to authorize retention of such persons at the Owner’s expense.

§ 4.4.3 In evaluating Claims, the Architect-Designer may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Architect-Designer in rendering a decision. The Architect-Designer may request the Owner to authorize retention of such persons at the Owner’s expense.

§ 4.4.4 If the Architect-Designer requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either provide a response on the requested supporting data, advise the Architect-Designer when the response or supporting data will be furnished or advise the Architect-Designer that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Architect-Designer will either reject or approve the Claim in whole or in part.

§ 4.4.5 The Architect-Designer will approve or reject Claims by written decision, which shall state the reasons therefor and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect-Designer shall be final and binding on the parties but subject to mediation and arbitration with the consent of both parties and to remedies as otherwise provided by law.

§ 4.4.6 When a written decision of the Architect states that (1) the decision is final but subject to mediation and arbitration and (2) a demand for arbitration of a Claim covered by such decision must be made within 30 days after the date on which the party making the demand receives the final written decision, then failure to demand arbitration within said 30 days’ period shall result in the Architect’s decision becoming final and binding upon the Owner and Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned. As a matter of law, claims by or against the State of Tennessee are not subject to arbitration.

§ 4.4.7 Upon receipt of a Claim against the Contractor or at any time thereafter, the Architect-Designer or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor’s default, the Architect-Designer or the Owner may, but is not obligated to, notify the surety and request the surety’s assistance in resolving the controversy.

§ 4.4.8 If a Claim relates to or is the subject of a mechanic’s lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the Claim by the Architect, by mediation or by arbitration. As a matter of law, the State of Tennessee and its property are not subject to mechanics’ and materialmen’s liens. Subcontractors, suppliers, and other claimants are protected through

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§ 4.5 THE STATE OF TENNESSEE IS NOT SUBJECT TO MANDATORY MEDIATION

§ 4.5.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 4.3.10, 9.10.4 and 9.10.5, shall, after initial decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.

§ 4.5.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to the Contract and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

§ 4.5.3 The parties shall share the mediator’s fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 4.6 THE STATE OF TENNESSEE IS NOT SUBJECT TO MANDATORY ARBITRATION

§ 4.6.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 4.3.10, 9.10.4 and 9.10.5, shall, after decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to arbitration. Prior to arbitration, the parties shall endeavor to resolve disputes by mediation in accordance with the provisions of Section 4.5.

§ 4.6.2 Claims not resolved by mediation shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. The demand for arbitration shall be filed in writing with the other party to the Contract and with the American Arbitration Association, and a copy shall be filed with the Architect.

§ 4.6.3 A demand for arbitration shall be made within the time limits specified in Sections 4.4.6 and 4.6.1 as applicable, and in other cases within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings, based on such Claim, would be barred by the applicable statute of limitations as determined pursuant to Section 13.7.

§ 4.6.4 Limitation on Consolidation or Joinder. No arbitration arising out of or relating to the Contract shall include, by consolidation or joinder or in any other manner, the Architect, the Architect’s employees or consultants, except by written consent containing specific reference to the Agreement and signed by the Architect, Owner, Contractor and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the Owner, Contractor, a separate contractor as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the Owner, Contractor or a separate contractor as described in Article 6 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described therein or with a person or entity not named or described therein. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 4.6.5 Claims and Timely Assertion of Claims. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.
§ 5.3.1 By appropriate agreement, written where legally required for validity, In the written agreement between the Contractor and Subcontractor, the Contractor shall require each Subcontractor, to the extent of the Work to be
performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume
toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the
Subcontractor’s Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. 
Designer Each subcontract agreement shall preserve and protect the rights of the Owner and Architect-Designer
under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting
thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in
the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor,
by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each
Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each
proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to
which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor
terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents.
Subcontractors will similarly make copies of applicable portions of such documents available to their respective
proposed Sub-subcontractors. In no event shall Subcontractor have any claim against Owner.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS
§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:
  .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to
Section 14.2 and only for those subcontract agreements which the Owner accepts by notifying the
Subcontractor and Contractor in writing; and
  .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the
Contract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor’s
compensation shall be equitably adjusted for increases in cost resulting from the suspension. Upon any such
assignment, Owner is not responsible for past breaches, monetary or otherwise, of the Contractor.

§ 5.4.3 Assignment is at the option of Owner. The Owner has no duty or obligation to exercise this option, nor is any
right created for any subcontractor to expect or rely upon such assignment.

ARTICLE 6   CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
§ 6.1 OWNER’S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS
§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner’s
own forces, and to award separate contracts in connection with other portions of the Project or other construction or
operations on the site under Conditions of the Contract identical or substantially similar to these including those
portions related to insurance and waiver of subrogation. Insurance If the Contractor claims that delay or additional
cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Section
4.3.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations
on the site, the term “Contractor” in the Contract Documents in each case shall mean the Contractor who executes
each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner’s own forces and of each separate
contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with
other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The
Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual
agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate
contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations
related to the Project with the Owner’s own forces, the Owner shall be deemed to be subject to the same obligations
and to have the same rights which apply to the Contractor under the Conditions of the Contract, including, without
excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.
§ 6.2 MUTUAL RESPONSIBILITY
§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor’s construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor’s Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect/Designer apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner’s or separate contractor’s completed or partially completed construction is fit and proper to receive the Contractor’s Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed construction activities, damage to the Work, or defective construction of a separate contractor.

§ 6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER’S RIGHT TO CLEAN UP
§ 6.3.1 If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect/Designer will allocate the cost among those responsible.

ARTICLE 7   CHANGES IN THE WORK
§ 7.1 GENERAL
§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect/Designer; a Construction Change Directive requires agreement by the Owner and Architect/Designer and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect/Designer alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS
§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect/Designer, stating their agreement upon all of the following:

.1 change in the Work;
.2 the amount of the adjustment, if any, in the Contract Sum and that the price includes overhead and profit, and represents all direct and indirect costs associated with the change; and
.3 the extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Section 7.3.3. Unless otherwise agreed in writing by Owner and Contractor, the method of determining adjustments in Contract Sum shall be by one or more of the methods set forth in 7.3.3, and shall be based on reasonable expenditures and savings as set forth in subparagraph 7.3.6.
§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect-Designer, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

.2 unit prices stated in the Contract Documents or subsequently agreed upon;

.3 cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

.4 as provided in Section 7.3.6.

§ 7.3.4 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect-Designer of the Contractor’s agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.5 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Architect-Designer on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit in accordance with subparagraph 7.3.10. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect-Designer may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.6 shall be limited to the following:

§ 7.3.6.1 Costs for the purpose of this subparagraph 7.3.6 shall be limited to the following:

.1 costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers’ compensation insurance; Direct Payroll Expense of labor;

.2 costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

.3 rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others; equipment rented from others, and not more than eighty percent (80%) of the Associated Equipment Distributors Nationally Averaged Rental Rates for Construction Equipment for machinery and equipment belonging to Contractor;

.4 costs of premiums for all bonds and insurance, permit fees, and sales, use or bonds and insurance to the extent required by Contract Documents, permit fees, and sales, use, or other similar taxes related to the Work; and

.5 additional costs of supervision and field office personnel directly attributable to the change; additional Direct Payroll Expense of superintendent directly attributable to authorized overtime.

§ 7.3.6.2 The following items are "Class 1 Time-Related Expenses", and shall be considered as costs when Contract Time is extended due to additional work or due to a Class 1 cause defined in 8.3, and solely to the extent directly attributable to extension of time. In all other instances, the following items shall be considered fixed costs already included in the general requirements of the Work for the duration of the Contract Time:
§ 7.3.8 Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties’ agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Architect will make an interim determination for purposes of monthly certification for payment for those costs. That determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a claim in accordance with Article 4, eligible amounts included in the Contract Sum by the Construction Change Directive for such changes shall be included in the Schedule of Values.

§ 7.3.9 When the Owner and Contractor agree with the determination made by the Architect-Designer concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

§ 7.3.10 In paragraph 7.3, the allowance for overhead and profit, included in the total cost to Owner, shall be limited to the following:

1. For Contractor performing work with its own forces, or Subcontractor performing work with its own forces or with a sub-subcontractor, allowance shall be 10% overhead and 5% profit.
2. For Contractor, for Work performed by Contractor’s Subcontractor, allowance shall be 5% profit on the amount due Subcontractor.
3. Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.6.
4. To facilitate checking for increases or decreases in the Contract Sum, proposals shall be accompanied by Contractor’s complete itemization of costs of work including labor, materials and equipment, plus allowance for overhead and profit.

§ 7.4 MINOR CHANGES IN THE WORK

§ 7.4.1 The Architect-Designer will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.
ARTICLE 8  TIME
§ 8.1 DEFINITIONS
§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION
§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by the Contract Documents or a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic’s liens and other security interests.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time in accordance with the Agreement.

§ 8.3 DELAYS AND EXTENSIONS OF TIME
§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or
The basis exists for an extension of time if Contractor is delayed in performing Work, but solely to the extent that delays are unforeseeable, unavoidable, and beyond the control and without fault or negligence, in whole or in part, of Contractor, subcontractors, sub-subcontractors, and suppliers at every tier, and said delays directly impact the Contractor’s ability to achieve Substantial Completion in accordance with the Contract Time requirements, and said delays cannot be made up by reasonable efforts otherwise, and said delays stem from the following causes:
  .1 Class 1 causes: an act or failure to act on the part of Owner or Designer or an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor’s control, or by delay authorized by the Owner pending mediation and arbitration, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine. Owner, or an injunction against Owner or Owner’s representatives.
  .2 Class 2 causes: abnormal weather, acts of God, riots, civil commotion, acts of War, fire, unavoidable casualties, epidemics, quarantine restrictions, labor disputes, unusual delay in transportation, freight embargoes, or insolvency of subcontractors, sub-subcontractors, or suppliers.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Section 4.3. If the basis exists for an extension of time under subparagraph 8.3.1, Owner may at its option:
  .1 in the case of additional work or a Class 1 cause, assign the Class 1 Time-Related Expenses, defined in 7.3.6.2, plus the overhead and profit allowed in 7.3.10, to a special allowance that can be earned based upon the extent of actual use of the related Time Extension in completion of the Work;
  .2 accept the reasonable and appropriate time extension as determined by Designer to cover such delay, and in the case of a Class 2 cause, there will be no corresponding adjustment in Contract Sum, and the sole recourse of Contractor will be entitlement to time extension as provided by Designer regardless of actual source or cause of delay;
order Contractor to accelerate construction activity by working overtime and by adding extra forces in order to overcome such delays, and adjusting the Contract Sum in accordance with Article 7 to compensate Contractor for such directed acceleration; however, direct costs used in determining such compensation shall be limited to properly substantiated and documented premium or overtime labor costs; or,

4 employ a combination of the above remedies.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents. Neither Owner nor Designer will be obligated or liable to Contractor for, and Contractor hereby expressly waives claims against Owner and Designer on account of damages, costs, expenses, or related impacts which Contractor, subcontractors, sub-subcontractors, suppliers, or other persons may incur as a result of a Class 2 cause enumerated in 8.3.1; Contractor’s sole and exclusive remedy and full compensation in such event shall be extension of Contract Time in accordance with provisions of the Contract Documents. Contractor likewise waives claims of damages, costs, or expenses due to a delay resulting from a Class 1 cause except and solely to the extent of costs allowed under 7.3.6.

§ 8.3.4 Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.3 or shall receive no consideration. If monthly Weather Delay Reports are required by the specifications, then claims for time extension based upon weather delays will be denied if a submitted report does not corroborate the claim or if no report was submitted when it was required, and Contractor waives the right to such claims.

§ 8.3.5 Extensions of time shall be implemented in accordance with Article 7.

ARTICLE 9   PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

§ 9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect-Designer a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect-Designer may require. This schedule, unless objected to by the Architect-Designer, shall be used as a basis for reviewing the Contractor’s Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before Prior to the date established for each progress payment, the Contractor shall submit to the Architect-Designer an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, if required, notarized and supported by such data substantiating the Contractor’s right to payment as the Owner or Architect-Designer may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.8, such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Such applications may shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner’s title to such materials and equipment or otherwise protect the Owner’s interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site, extent those
costs have been included in the Contract Sum and actually incurred. Additional costs, which may be attendant to
off-site storage, are the responsibility of the Contractor, and cannot be claimed by Contractor against Owner.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner
no later than the time of payment, at the time payment is received by the Contractor. The Contractor further warrants
that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously
issued and payments received from the Owner shall, to the best of the Contractor’s knowledge, information and
belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor,
Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor,
materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect-Designer will, within seven days after receipt of the Contractor’s Application for Payment,
either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect
Designer determines is properly due, or notify the Contractor and Owner in writing of the Architect-Designer’s
reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect-Designer to the
Owner, based on the Architect-Designer’s evaluation of the Work and the data comprising the Application for
Payment, that the Work has progressed to the point indicated and that, to the best of the Architect-Designer’s
knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The
foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents
upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from
the Contract Documents prior to completion and to specific qualifications expressed by the Architect-Designer. The
issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to
payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that
the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect-Designer may withhold a Certificate for Payment in whole or in part, to the extent reasonably
necessary to protect the Owner, if in the Architect-Designer’s opinion the representations to the Owner required by
Section 9.4.2 cannot be made. If the Architect-Designer is unable to certify payment in the amount of the
Application, the Architect-Designer will notify the Contractor and Owner as provided in Section 9.4.1. If the
Contractor and Architect-Designer cannot agree on a revised amount, the Architect-Designer will promptly issue a
Certificate for Payment for the amount for which the Architect-Designer is able to make such representations to the
Owner. The Architect-Designer may also withhold a Certificate for Payment or, because of subsequently discovered
evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be
necessary in the Architect-Designer’s opinion to protect the Owner from loss for which the Contractor is
responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of:

1. defective Work not remedied;
2. third party claims filed or reasonable evidence indicating probable filing of such claims unless
   security acceptable to the Owner is provided by the Contractor;
3. failure of the Contractor to make payments properly to Subcontractors or for labor, materials or
   equipment;
4. reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
5. damage to the Owner or another contractor;
6. reasonable evidence that the Work will not be completed within the Contract Time, and that the
   unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
   or
7. persistent failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts
previously withheld.
§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect-Designer has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect in accordance with TCA § 12-4-701 et seq, as may from time to time be amended.

§ 9.6.1.1 Payment is due not later than forty five (45) days after an undisputed Certificate for Payment has been received by Owner. Owner will endeavor to make payment within twenty-one (21) days, but shall not be obligated to do so.

§ 9.6.1.2 Based upon Applications for Payment submitted to the Designer by the Contractor and Certificates for Payment issued by the Designer, the Owner shall make progress payments monthly to the Contractor as provided in the Contract Documents as follows: Ninety five percent (95%) of the portion of the Contract Sum properly allocable to labor, materials, and equipment incorporated in the Work and materials and equipment suitably stored in accordance with subparagraph 9.3.2, less the aggregate of previous payments made; and, upon Substantial Completion of the entire Work, a sum sufficient to increase the total payments to ninety eight percent (98%) of the Contract Sum, less such amounts as the Designer shall determine for incomplete work and unsettled claims and liquidated damages.

§ 9.6.2 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor’s portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor’s portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect-Designer will, on request, furnish a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect-Designer and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 Neither the Owner nor Architect-Designer shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 Payment to material suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision. Provisions regarding retainage of TCA § 66-11-144 are applicable to contracts for improvement of real property where Contract Sum is five hundred thousand dollars ($500,000) or more. Contractor shall comply with these provisions and the procedures pursuant thereto established by the Tennessee State Treasurer and Department of Finance & Administration for establishment of an escrow account.

§ 9.7 FAILURE OF PAYMENT

§ 9.7.1 If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor’s Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by arbitration, then the date may, upon seven additional days’ written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and
§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. In order to occupy or utilize the Work for its intended use, Owner must have received complete Product Data, Operating & Maintenance Data, orientation, and training, as may be required by specifications, and use and occupancy permits.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor’s list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect’s inspection discloses any item, whether or not included on the Contractor’s list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate, subject to the provisions of subparagraph 9.12.2. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and submission by Contractor and certification by Designer of an application for payment with consent of surety, if any, the Owner shall make payment of appropriate reduction in retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents of it. Such payment shall be in accordance with clause 9.6.1.2.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.4.1.5 and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.
§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect-Designer will promptly make such inspection and, when the Architect-Designer finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect-Designer will promptly issue a final Certificate for Payment stating that to the best of the Architect-Designer’s knowledge, information and belief, and on the basis of the Architect-Designer’s on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect-Designer’s final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor’s being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect-Designer (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner’s property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days’ prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond shall furnish acknowledgement of the matter from the Surety satisfactory to the Owner to indemnify the Owner against such lien matters. If such lien matter remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien matters, including all costs and reasonable attorneys’ fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect-Designer so confirms, the Owner shall, upon application by the Contractor and certification by the Architect-Designer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainerage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect-Designer prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall not constitute a waiver of Claims by the Owner except those arising from the following:

1. liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
2. failure of the Work to comply with the requirements of the Contract Documents irrespective of when such failure is discovered; or
3. terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.10.6 Final Payment constituting the entire unpaid balance of Contract Sum, shall be paid by Owner to Contractor when Work has been completed, the Contract fully performed, and a final Certificate for Payment issued by Designer.

§ 9.11 METHOD OF PAYMENT
§ 9.11.1 Payments to Contractor shall be made through Owner’s automated clearinghouse wire transfer system. Contractor shall have completed an Authorization Agreement for Automatic Deposits ACH Credits Form prior to commencing Work and prior to submitting a first application for payment.

§ 9.11.2 Debit entries to correct errors authorized by the Authorization Agreement for Automatic Deposits ACH Credits Form shall be limited to those errors detected prior to the effective date of the credit entry. The remittance advice shall note that a correcting entry was made. Corrections shall be made within two banking days of the effective date of the original transaction. Other errors detected at a later date shall take the form of a refund, or in some instances, a credit memo if additional payments are to be made.

§ 9.11.3 The Owner reserves the right to deduct from amounts which are or shall become due and payable to Contractor under this or any contract between the parties any amounts which are or shall become due and payable to the State by the Contractor.

§ 9.12 LIQUIDATED DAMAGES
§ 9.12.1 Time being of the essence, Contractor further agrees to accept conditions for liquidated damages in the amount set forth in Contract Documents for each calendar day in excess of allotted time for Substantial Completion, or approved extension thereof, parties agreeing that the amount of damages resulting from delay would be uncertain and difficult to prove, and further agreeing that such liquidated damages set forth in the Owner-Contractor Agreement are a reasonable estimate of those damages which could result from delay.

§ 9.12.2 If a portion of the Work is certified Substantially Complete, the amount of Liquidated Damages applicable to the remaining Work may be reduced by written mutual agreement.

§ 9.12.3 Secondary Liquidated Damages shall be twenty-five percent (25%) of that originally required by the Contract Documents, and shall accrue until such time that Work has been completed and the Contract fully performed if:
.1 the time for completion stipulated in the Certificate of Substantial Completion has passed; or, if no such time was stipulated, then thirty (30) calendar days has passed following the certified date of Substantial Completion; and,
.2 the Contract Time, including approved extensions, plus thirty (30) calendar days, has passed.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY
§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS
§ 10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY
§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:
.1 employees on the Work and other persons who may be affected thereby;
.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor’s Subcontractors or Sub-subcontractors; and
.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.
§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect Designer or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor’s obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor’s organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor’s superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect Designer.

§ 10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, Contractor which has neither been rendered harmless nor specified as inherent in the Work, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing. Reasonable precautions shall include, but not be limited to, precautions inherent in the Work.

§ 10.3.2 Under circumstances described in 10.3.1, Owner will have the option to either terminate the contract as provided in Article 14, proceed with Contractor in a mutually agreed plan of action, or as follows: The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect Designer the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect Designer will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect Designer has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect Designer have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor’s reasonable additional costs of shut-down, delay and start-up, which adjustments shall be accomplished as provided for claims in Article 4 and for changes in the Work in Article 7.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect’s consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury or destruction of tangible property (other than the Work itself) and provided that such damage, loss or expense is not due to the sole negligence of a party seeking indemnity.

§ 10.4 The Owner shall not be responsible under Section 10.3 for materials and substances brought to the site by the Contractor unless such materials or substances were required by the Contract Documents.
§ 10.5 If, without negligence on the part of the Contractor, the Contractor is held liable for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.6 EMERGENCIES
§ 10.6.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor’s discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Section 4.3 and Article 7.

ARTICLE 11 INSURANCE AND BONDS
§ 11.1 CONTRACTOR’S LIABILITY INSURANCE
§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor and the Owner from claims set forth below which may arise out of or result from the Contractor’s operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 claims under workers’ compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
.2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor’s employees;
.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor’s employees;
.4 claims for damages insured by usual personal injury liability coverage;
.5 claims for damages, other than including to the Work itself, because of injury to or destruction of tangible property on or away from the site, including loss of use resulting therefrom;
.6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
.7 claims for bodily injury or property damage arising out of completed operations; and
.8 claims involving contractual liability insurance applicable to the Contractor’s obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coversages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment. Specific lines of coverage and limits of liability provided by Contractor shall be written in a comprehensive form, satisfactory to Owner in the following minimum requirements:

.a Comprehensive General Liability, including:
    Premises / Operations;
    Underground / Explosion / Collapse;
    Products / Completed Operations;
    Contractual;
    Independent Contractors;
    Owner / Contractor Protective;
    Broad Form Property Damage;
    Personal Injury (Employment Exclusion deleted)
.b Combined single limits for bodily injury and property damage:
    Each Occurrence:$1,000,000
    Aggregate:$2,000,000
.c Products and Completed Operations to be maintained for one year after final payment.
.d Asbestos Abatement Insurance
    .1 Non-friable Asbestos: If removal or abatement of non-friable asbestos is included in the Work, and Contractor’s General Liability Insurance coverage excludes risks associated with asbestos, then Contractor shall provide evidence of a Special Endorsement.
    .2 Friable Asbestos: If removal or abatement of friable asbestos is included in the Work, then Contractor shall provide evidence of a Special Endorsement.
3 Special Endorsement: Evidence of a Special Endorsement shall be in the form of a Certificate of Insurance certifying a special endorsement for asbestos abatement insurance with a minimum $500,000 limit of liability. If Contractor is performing no portion of the asbestos removal or abatement with its own forces, then Contractor, in lieu of its own such endorsement, may substitute a Certificate showing such special endorsement covering the subcontractor or sub-subcontractor actually performing the asbestos removal or abatement.

2 Comprehensive Automobile Liability:
   a Including owned, hired, and non-owned vehicles; or, if there are no owned vehicles, Contractor may provide written certification of such and provide coverage limited to hired and non-owned vehicles.
   b Bodily injury and property damage combined single limits:
      Each Occurrence: $500,000

3 Workers Compensation and Employer’s Liability, (without restriction as to whether covered by Workmen’s Compensation law):
   a Workers Compensation: according to statute
   b Employer’s Liability: $100,000

4 If an exposure exists, Aircraft and Watercraft Liability (owned & non-owned), with limits approved by Owner, shall be provided.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days’ prior written notice has been given to the Owner. Certificate(s) of insurance provided to attest to coverage shall specifically cite each element of coverage and not less than limits set forth in subparagraph 11.1.2, as confirmation of complete coverage, and shall identify Contractor, Producer, insurance Carrier, Project, and certificate holder, and state Producer’s notice requirements as set forth in 11.1.4. The term "Commercial General Liability” shall mean all of the coverages listed in 11.1.2.1.a unless specifically noted otherwise in the certificate. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Section 9.10.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor’s information and belief.

§ 11.1.4 Contractor shall notify Owner in writing of changes in coverage or carrier not later than ten (10) days after notification of Contractor by Producer, or 10 days before Contractor makes a change, whichever occurs first. Contractor shall require that if policies are cancelled or modified before expiration date thereof, Producer shall endeavor to mail 10 days prior written notice to certificate holder named therein.

§ 11.2 OWNER’S LIABILITY INSURANCE
§ 11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner’s usual liability insurance.

§ 11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE
§ 11.3.1 Optionally, the Owner may require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor’s usual sources as primary coverage for the Owner’s, Contractor’s and Architect’s vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage, and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor’s Liability Insurance under Sections 11.1.1.2 through 11.1.1.5.

§ 11.3.2 To the extent damages are covered by Project Management Protective Liability insurance, the Owner, Contractor and Architect waive all rights against each other for damages, except such rights as they may have to the proceeds of such insurance. The policy shall provide for such waivers of subrogation by endorsement or otherwise.

§ 11.3.3 The Owner shall not require the Contractor to include the Owner, Architect or other persons or entities as additional insureds on the Contractor’s Liability Insurance coverage under Section 11.1.
§ 11.4 PROPERTY INSURANCE

§ 11.4.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder’s risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.4 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors, and Sub-subcontractors in the Work, and any other person or entity as additional insured.

§ 11.4.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and debris removal, and shall cover reasonable compensation for Architect’s and Contractor’s services and expenses required as a result of such insured loss. Such insurance carried by the Owner will include a $10,000 deductible clause. The deductible is the responsibility of the Contractor.

§ 11.4.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of the Owner as a named insured, Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.4.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.4.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit. The Owner’s property insurance shall exclude portions of the Work stored off-site or in transit; and the Contractor shall provide insurance upon such portions to protect the Owner’s interest.

§ 11.4.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.4.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.4.3 Loss of Use Insurance. The Owner, at the Owner’s option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner’s property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner’s property, including consequential losses due to fire or other hazards however caused.
§ 11.4.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.4.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.4.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.4.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.4. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days’ prior written notice has been given to the Contractor, issuing company will endeavor to mail ten (10) days written notice to the Contractor should the policy be canceled prior to the expiration date. Failure to mail such notice shall impose no obligation or liability of any kind upon the Owner or issuing company.

§ 11.4.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect’s consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.4 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect’s consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waiver of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.4.8 A loss insured under Owner’s property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.4.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.4.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner’s duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with an arbitration award in which case the procedure shall be as provided in Section 4.6. If after such-after an insured loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.4.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner’s exercise of this power; if such objection is made, the dispute shall be resolved as provided in Sections 4.5 and 4.6. The Owner as fiduciary shall, in the case of arbitration, make settlement with insurers in accordance with directions of the arbitrator. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution insurers.
§ 11.5 PERFORMANCE BOND AND PAYMENT BOND
§ 11.5.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract. If the initial Contract Sum as awarded exceeds $100,000, Contractor shall provide Contract Bond, in the amount of one hundred percent (100%) of Contract Sum covering faithful performance of contract and payment of obligations arising thereunder. If a Contract Bond is required, and a Three-Year Roof Bond is also stipulated in the Bidding Documents, then the Three-Year Roof Bond shall be provided as stipulated. Bond(s) shall be executed on Tennessee State Building Commission Standard Form(s) exhibited in Bidding Documents for project, and subject to provisions of subparagraph 11.5.3.

§ 11.5.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

§ 11.5.3 Surety is the person or entity identified as such in a bond and is referred to throughout the Contract Documents as if singular in number. The term "Surety" means the Surety or the Surety’s authorized representative. Surety Company issuing bond shall be licensed to transact business in Tennessee by Department of Commerce and Insurance. Bonds shall have certified and current Power-of-Attorney for the Surety’s Attorney-in-Fact attached. Attorney-in-fact who executes bond on behalf of Surety shall be one who is licensed by Tennessee as a resident agent, and shall affix license number to bond; or, countersignature by and license number of a licensed resident agent shall be affixed to the bond in addition to the signature of the Attorney-in-Fact.

ARTICLE 12   UNCOVERING AND CORRECTION OF WORK
§ 12.1 UNCOVERING OF WORK
§ 12.1.1 If a portion of the Work is covered contrary to the Architect-Designer’s request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect-Designer, be uncovered for the Architect-Designer’s examination and be replaced at the Contractor’s expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the Architect-Designer has not specifically requested to examine prior to its being covered, the Architect-Designer may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner’s expense. If such Work is not in accordance with the Contract Documents, correction—uncovering, correction, and recovering shall be at the Contractor’s expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK
§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION
§ 12.2.1.1 The Contractor shall promptly correct Work rejected by the Architect-Designer or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect-Designer’s services and expenses made necessary thereby, shall be at the Contractor’s expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION
§ 12.2.2.1 In addition to the Contractor’s obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work of the Contractor is found to be not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4. Three Year Roof Bond has been provided, then
§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work.

§ 12.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor’s correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates to 12.2.2, and time periods of applicable special warranties, relate only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor’s liability with respect to the Contractor’s obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK
§ 12.3.1 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS
§ 13.1 GOVERNING LAW
§ 13.1.1 The Contract shall be governed by the law of the place where the Project is located, State of Tennessee.

§ 13.2 SUCCESSORS AND assigns
§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to an institutional lender providing construction financing for the Project. In such event, the lender shall assume the Owner’s rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE
§ 13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.
§ 13.4 RIGHTS AND REMEDIES
§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect-Designer or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

§ 13.4.3 If normal procedures within the Contract fail to satisfy a claim against the Owner, further action is to be taken up with the Tennessee Claims Commission, pursuant to TCA § 9-8-101, et seq. Damages recoverable against the State shall be limited expressly to claims awarded by the Commission.

§ 13.5 TESTS AND INSPECTIONS
§ 13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect-Designer timely notice of when and where tests and inspections are to be made so that the Architect-Designer may be present for such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

§ 13.5.2 If the Architect-Designer, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect-Designer will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect-Designer of when and where tests and inspections are to be made so that the Architect-Designer may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner’s expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect’s services and expenses shall be at the Contractor’s expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect-Designer.

§ 13.5.5 If the Architect-Designer is to observe tests, inspections or approvals required by the Contract Documents, the Architect-Designer will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST
§ 13.6.1 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located past due as stated in subparagraph 9.6.1 in accordance with TCA § 12-4-704, as may from time to time be amended.

§ 13.7 COMMENCEMENT OF STATUTORY LIMITATION PERIOD
§ 13.7.1 As between the Owner and Contractor:

1. Before Substantially Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged
cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;

.2 Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and

.3 After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any Warranty provided under Section 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 issuance of an order of a court or other public authority having jurisdiction which requires all Work to be stopped;

.2 an act of government, such as a declaration of national emergency which requires all Work to be stopped; or

.3 because the Architect-Designer has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

.4 the Owner has failed to furnish to the Contractor promptly, upon the Contractor’s request, reasonable evidence as required by Section 2.2.1 Documents.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days’ written notice to the Owner and Architect-Designer, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damage costs as defined in 7.3.6.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner’s obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days’ written notice to the Owner and the Architect-Designer, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor:

.1 persistently refuses or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Architect/Designer that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor’s surety, if any, seven days’ written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:
1. take possession of all Work in place and of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
2. accept assignment of subcontracts pursuant to Section 5.4; and
3. finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect/Designer’s services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect/Designer upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE
§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:
1. that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
2. that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE
§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner’s convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner’s convenience, the Contractor shall:
1. cease operations as directed by the Owner in the notice;
2. take actions necessary, or that the Owner may direct, for the protection and preservation of the Work, and Work, including materials for which Owner has paid and which are stored off-site; and,
3. except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner’s convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed, the completed portion of Work plus a fraction of five percent (5%) of the remaining balance of the Contract Sum, which fraction shall be equal to the value of the Work completed divided by the Contract Sum.
SUPPLEMENTARY CONDITIONS

MODIFICATIONS to the CONDITIONS OF THE CONTRACT

The following supplements modify, change, delete from or add to the Conditions of the Contract:

AIA Document A201
GENERAL CONDITIONS of the Contract for Construction,

Where an Article, Paragraph, Subparagraph or Clause of Conditions is modified or deleted by Supplementary Conditions, unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

ARTICLE 3
CONTRACTOR

3.22 RECORDS
3.22.1 The Contractor shall maintain documentation for all charges under this Contract. The books, records, and documents of the Contractor, for work performed or money received under this Contract, shall be maintained for a period of five (5) full years from the date of the final payment and shall be subject to audit at any reasonable time and upon reasonable notice by the State, the Comptroller of the Treasury, or their duly appointed representatives. The financial statements shall be prepared in accordance with generally accepted accounting principles.

ARTICLE 11
INSURANCE

11.4.1 Delete first sentence and substitute:
The Contractor shall purchase from and maintain, with a company or companies licensed to do business in Tennessee by the Department of Commerce and Insurance, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum plus value of subsequent Contract modifications for the covered project at the site on a replacement cost basis.

11.4.1.1 Delete the last two sentences and substitute: Any deductibles shall be the responsibility of the Contractor.

11.4.1.2 Delete clause.

11.4.1.4 Delete the clause in its entirety and substitute: This property insurance shall cover portions of the work stored off the site and also portions of the work in transit. The Contractor shall present a certificate of insurance demonstrating coverage of the property stored off the site or in transit at the time payment for that portion of the work is presented.

11.4.2 At beginning of first sentence delete "The Owner shall purchase..." and substitute "The Contractor shall purchase...".

11.4.6 Substitute all references to "Owner" with "Contractor", and substitute all references to "Contractor" with "Owner".

11.4.8 Delete clause.

11.4.9 At the end of the paragraph delete "after notification of a change in the work in accordance with Article 7."

END OF SECTION
PART 1 GENERAL

1.01 PROJECT

A. Project Name: Elevator Modernization Various Facilities, SBC No. 529 000 01 2014.

B. Owner’s Name: Department of General Services, State of Tennessee.

C. The Project consists of the construction of modernization of existing gearless, geared and hydraulic elevator equipment in four separate state office buildings: William R. Snodgrass Tennessee Tower, Andrew Jackson Building, Rachel Jackson Building and West Tennessee Regional Health Center. The work in each facility includes mechanical and electrical improvements to accommodate the elevatornizations.

1. William R. Snodgrass Tennessee Tower, Nashville, Tennessee: Modernize 5 High Rise and 5 Low Rise Elevators. Modernization includes control upgrades, destination dispatch, door equipment, fixtures and cabs. In addition there will be improvements to the traction elevator shuttle elevator, modernization of the hydraulic elevator in the loading Dock and replacement of the Trepel scissors lift in the back of the loading dock.

2. Andrew Jackson State Building, Nashville, Tennessee: Modernize 7 gearless passenger elevators and 1 geared service elevator. Modernization includes control upgrades, destination dispatch, door equipment, fixtures and cab interiors.


4. West Tennessee Regional Public Health, Jackson, Tennessee - Modernize 2 hydraulic elevators with new controls, power units, fixtures and cab replacements.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 005213 - Agreement Form.

1.03 DESCRIPTION OF ALTERATIONS WORK

A. Scope of demolition and removal work is shown on drawings.

B. Scope of alterations work is shown on drawings.

1.04 OWNER OCCUPANCY

A. The Owner will occupy the premises during the entire construction period for conduct of normal operations.

B. Cooperate with Owner to minimize conflict and to facilitate Owner’s operations.

C. Schedule the Work to accommodate Owner occupancy.

1.05 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

B. Arrange use of site and premises to allow:

1. Owner occupancy.

2. Use of site and premises by the public.

C. Do not use existing building spaces outside of the area of the Work for storage. Do not use spaces within the area of the Work for general storage. Short term storage of items within the area of the Work will be acceptable - in this case the Contractor assumes all responsibility for security of stored items.
D. Time Restrictions: Generally perform work inside the existing building during normal business working hours of 7:00 am to 5:00 pm, Monday through Friday, unless agreed otherwise with the facility’s in-house representative responsible for coordination with the work of this Project. Specifically coordinate the following if job conditions dictate that work items are necessary outside the above hours:
   1. Weekend hours.
   2. Early morning hours.
   3. Hours for utility shutdowns.
   4. Hours for core drilling or other similar noisy activity.

E. Utility Outages and Interruptions:
   1. Do not proceed with utility interruptions without the Owner’s in-house representative’s written permission.
   2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction. If these systems are shut down, provide personnel equipped with push-to-talk communications capabilities stationed throughout the facility for purposes of maintaining a fire watch.
   3. Do not interrupt other utilities serving facilities occupied by Owner or others without arranging to provide temporary utility services.
   4. Prevent accidental disruption of utility services to other facilities.

1.06 WORK PHASES

A. Perform the Work of each Phase of the overall Project to accommodate the Owner’s use of each premises during the construction period, and to provide for continuous public usage of each premises. Coordinate construction schedule and operations with the Designer.
   1. There will be one Notice to Proceed for the entire Project. The end of each Phase will be the date that occurs on the final calendar day when the number of days identified as "Contract Time" on the Bid Form occurs, unless changed by Change Order.
   2. The Phases identified on the Bid Form are defined as the portions of the Work occurring at the following facilities:
      b. Phase II: Andrew Jackson State Building located in Nashville, Tennessee.
      d. Phase IV: West Tennessee Regional Health located in Jackson, Tennessee.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES administrative and procedural requirements applicable to unit prices either established in this Section or established in the Agreement based upon Owner's solicitation and Contractor's bid. Solicited unit prices are denoted in the “Definitions” Article below by having “(S)” as the Unit Price per Unit. Solicited unit prices are subject to determination at the time of a change in the Work if the bid unit price was not accepted and not listed in the Agreement. Unit prices may also be established and added to this Section by appropriate Modification.

B. RELATED SECTIONS are referenced in the definition of each unit price item.

C. ALLOWANCES: For each Unit Price item, an allowance is established in the Article “Definitions” as a Base Quantity included in the Work. If no Base Quantity is stipulated, or if the Base Quantity is zero, then the unit price is invalid.

D. UNIT PRICES include all direct and indirect costs, except overhead and profit, associated with the unit price item. If cumulative adjustments exceed, or are expected to exceed, a cumulative twenty-five percent (25%) of the Base Quantity (whether more than or less than), either party to the Contract may initiate renegotiation for a new unit price. Such a new unit price shall be made a part of the Contract by appropriate Modification, and will apply to adjustments that exceed a cumulative twenty-five percent (25%) of the Base Quantity and have not already been made.

E. INCREASES AND DECREASES in the Contract Sum by change order or construction change directive will be made based on the unit prices commensurate with either:
   1. An interim increase or decrease in base quantities as agreed mutually or as deemed reasonably necessary by the Designer and consistent with actual quantities to date; or,
   2. A final increase or decrease in base quantities to equal actual quantities when no further work defined as a unit price item is anticipated.

1.02 SUBMITTALS: Contractor shall keep a daily log of actual quantities of specified work units encountered, consumed, or expended. When submitting an application for payment that includes payment for Unit Price items, Contractor shall provide Designer a copy or report of the log that is acceptable to Designer. Actual quantities and the Contractor's log are subject to verification by Designer.

1.03 DEFINITIONS: For each Unit Price item, definitions are as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Related Sections</th>
<th>Base Quantity</th>
<th>Unit Price per Unit</th>
<th>Unit</th>
<th>Work Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>142100</td>
<td>10</td>
<td>(S) Motor</td>
<td>Tennessee Tower, Elevators 1-10 Motor Refurbishment</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>142120</td>
<td>7</td>
<td>(S) Motor</td>
<td>Andrew Jackson, Elevators 1-7 Motor Refurbishment</td>
<td></td>
</tr>
</tbody>
</table>
PART 1 - GENERAL

1.01 SUPPORTING DOCUMENTATION for PROPOSALS or CLAIMS

A. Propose changes to Work in writing, specifically describing proposed change, or briefly describing the proposed change with specific reference to a completely descriptive attachment.

B. Propose changes in Contract Sum in writing, stating briefly the reason for change, and summarizing material, equipment, labor, overhead, and profit factors for Contractor, Subcontractors, and Sub-subcontractors. Unless waived by Owner, attach itemization of values of direct cost on form shown as Section 01 26 50, or similar form which provides same information, citing:
   1. Materials: units, costs, quantities, totals;
   2. Equipment: hours, rates, totals; and,
   3. Labor: hours, rates, totals.

C. Propose changes in Contract Time in writing:
   1. Fully describe the reasons for the change and effect of the change on the construction schedule, and attach a revised Progress Schedule; and/or,
   2. For a change based on weather-related delay, provide and attach weather data from National Oceanic and Atmospheric Administration (NOAA) as an impartial basis for determining justifiable extensions, or daily work logs which describe actual local weather conditions and impact, subject to approval by Designer. Provide and attach NOAA comparative data on normals, means, and extremes if not already provided in Project Manual.

1.02 FORM for CHANGE ORDERS and CONSTRUCTION CHANGE DIRECTIVES

The form shall be that shown as Section 01 26 40, or a similarly formatted document utilizing the same text. Complete description of change in Work shall be included in the body of the form or in referenced attachment. Change in Contract Sum and Contract Time shall be expressed in the body of the form.

1.03 SIGNATURES:

A. Form shall be signed by authorized representatives of each of the entities required by Conditions of the Contract.

B. Proposed Change Orders will be prepared by Owner or Designer and normally signed by both before being issued to Contractor. Contractor shall sign acceptable proposed Change Orders, or refuse to sign if in disagreement, then shall retain one (1) counterpart and return other counterparts to Designer.

END OF SECTION
SECTION 01 26 20
WEATHER DELAYS

PART 1 - GENERAL

1.01 EXTENSIONS OF CONTRACT TIME

If the basis exists for an extension of time in accordance with paragraph 8.3 of the Conditions, an extension of time on the basis of weather may be granted only for the number of Weather Delay Days in excess of the number of days listed as the Standard Baseline for that month.

1.02 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE

A. The Owner has reviewed weather data available from the National Oceanic and Atmospheric Administration (NOAA) and determined a Standard Baseline of average climatic range for the State of Tennessee.

B. Standard Baseline is defined as the normal number of calendar days for each month during which construction activity exposed to weather conditions is expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is included in the Work and is not eligible for extension of Contract Time.

C. Standard Baseline is as follows:

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>11</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

1.03 ADVERSE WEATHER and WEATHER DELAY DAYS

A. Adverse Weather is defined as the occurrence of one or more of the following conditions within a twenty-four (24) hour day that prevents construction activity exposed to weather conditions or access to the site:

1. Precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10") liquid measure;

2. Temperatures that do not rise above that required for the day's construction activity, if such temperature requirement is specified or accepted as standard industry practice; and/or,


B. Adverse Weather may include, if appropriate, "dry-out" or "mud" days:

1. Resulting from precipitation days that occur beyond the standard baseline;

2. Only if there is a hindrance to site access or sitework and Contractor has taken all reasonable accommodations to avoid such hindrance; and,

3. At a rate no greater than one (1) make-up day for each day or consecutive days of precipitation beyond the standard baseline that total one (1) inch or more, liquid measure, unless specifically recommended otherwise by the Designer.

C. A Weather Delay Day may be counted if adverse weather prevents work on the project for fifty percent (50%) or more of the contractor's scheduled work day and critical path construction activities were included in the day's schedule, including a weekend day or holiday if Contractor has scheduled construction activity that day.

D. Contractor shall take into account that certain construction activities are more affected by adverse weather and seasonal conditions than other activities, and that "dry-out" or "mud" days are not eligible to be counted as a Weather Delay Day until the standard baseline is exceeded.
Hence, Contractor should allow for an appropriate number of additional days associated with the Standard Baseline days in which such applicable construction activities are expected to be prevented and suspended.

1.04 DOCUMENTATION and SUBMITTALS

A. Submit daily jobsite work logs showing which and to what extent critical path construction activities have been affected by weather on a monthly basis.

B. Submit actual weather data to support claim for time extension obtained from nearest NOAA weather station or other independently verified source approved by Designer at beginning of project.

C. Use Standard Baseline data provided in this Section when documenting actual delays due to weather in excess of the average climatic range.

D. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods, and submit in accordance with the procedures for Claims established in paragraph 4.3 of the Conditions.

E. If an extension of the Contract Time is appropriate, such extension shall be made in accordance with the provisions of Article 7 of the Conditions, and the applicable General Requirements.

END OF SECTION
SECTION 01 26 40
FORM FOR AMENDMENT, CHANGE ORDER, OR DIRECTIVE

☐ Amendment
☐ Change Order
☐ Construction Change Directive

The following changes in the Contract are hereby directed:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>The original Contract Sum</td>
<td>$</td>
</tr>
<tr>
<td>Net Change previously authorized</td>
<td>$</td>
</tr>
<tr>
<td>The Contract Sum prior to this Modification</td>
<td>$</td>
</tr>
<tr>
<td>This modification (increases/does not change/decreases) the Contract Sum</td>
<td>$</td>
</tr>
<tr>
<td>The new Contract sum, including this modification</td>
<td>$</td>
</tr>
<tr>
<td>This modification (increases/does not change/decreases) the Contract Time</td>
<td></td>
</tr>
<tr>
<td>The new Contract Time, including this modification</td>
<td></td>
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<tr>
<td>The last day of the Contract Time, including this modification</td>
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</tbody>
</table>

Contractor  
signed  
name  
title  
for  

Designer  
signed  
name  
title  
for  

Owner  
signed  
name  
title  
for  

Additional Owner signatures (as required):

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<thead>
<tr>
<th>Description</th>
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| signed  
name  
title  
for  |  |
| signed  
name  
title  
for  |  |
| signed  
name  
title  
for  |  |
<table>
<thead>
<tr>
<th>Description</th>
<th>Material</th>
<th>Equipment</th>
<th>Labor</th>
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<tbody>
<tr>
<td></td>
<td>Unit</td>
<td>Cost</td>
<td>Quantity</td>
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</table>

Sub-Totals

Total
PART 1 - GENERAL

1.01 FORM and APPROVAL
   A. The form for schedule of values shall be AIA Document G703 Continuation Sheet.
   B. If objected to by Designer, revise and resubmit to Designer's satisfaction prior to submitting application for payment.

1.02 ALLOCATION OF VALUES
   A. If the Work is divided into defined portions ("Phases"), intended to have distinct commencement, duration, or completion requirements, divide the allocation to correspond to the Phases, then within each Phase, subdivide the allocations as specified in the following paragraphs.
   B. Provide a single line item to account for mobilization and general administration, and fulfilling General Requirements.
   C. If sitework is included, other than minor sitework incidental to a building or major structure, include sitework in single heading. Subdivide site utilities, roads and parking, and appurtenances according to general type within this division of construction activity.
   D. For each involved building or major structure, provide a separate group of line items corresponding to Divisions and Sections of the Specifications. Further subdivide as desired, but maintain a distinct and identifiable correspondence to this allocation.
   E. Account for Unit Prices and Allowances with a line item for each, until incorporating each into the appropriate allocations for the final statement of accounting.
   F. Account for Modifications with a line item for each, until incorporating each into the appropriate allocations for the final statement of accounting.

END OF SECTION
PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS FOR ALL APPLICATIONS

A. FORM:
   2. Use AIA Document G703 Continuation Sheet itemized with the line items and values of the Schedule of Values accepted by the Designer, and values and percentages for each line item.

B. SUBMITTAL: Submit the original and six (6) copies of each application to the Designer, with required attachments and accompanying submittals, in accordance with other applicable articles of this Section.

1.02 APPLICATION FOR PROGRESS PAYMENT

A. STORED MATERIALS
   1. Materials stored on-site but not yet incorporated into the Work may be claimed for payment.
   2. Materials suitably stored off-site may be claimed for payment provided that the following is attached to each copy of application:
      a. A statement identifying where materials are stored, and that materials are tagged to identify them for use in the project;
      b. Copies of bills of sale for materials claimed; and,
      c. A certificate of insurance covering materials claimed, recognizing Owner's right to make claims.

1.02 ATTACHMENTS AND ACCOMPANYING SUBMITTALS

A. Attach the following to each copy of each application:
   1. Continuation sheets,
   2. Consent of Surety if applicable for reduction in retainage, and
   3. Documents required for materials stored off-site.

B. Submit three (3) copies of the following with application:
   1. Visitor Log for the period covered by application;
   2. Progress Schedule, updated and current, indicating progress through the period covered by application and scheduled progress through completion of Work;
   3. Submittal Log for entire project through the period covered by application, if required;
   4. Payroll Transmittal letter(s) to Tennessee Department of Labor & Workforce Development for payrolls sent since last application, applicable; and,
   5. Personnel Used in Contract Performance Attestation, exhibited as Section 01 29 76.13.

1.03 APPLICATION FOR PAYMENT AFTER SUBSTANTIAL COMPLETION

A. After Designer has certified that the Work is Substantially Complete, Contractor shall submit application for payment, including appropriate reduction in retainage, with the following attachments:
1. Continuation sheets described in 1.01 A.2;

2. Consent of Surety to Reduction in Retainage, using AIA Document G707A or a similarly formed letter, with the original of the Consent attached to the original of the application, and a copy of the consent attached to each copy of the application; and,

3. Documents required for materials stored off-site, if applicable, in accordance with 1.02 A.

B. In order to reduce retainage below the amount corresponding to Substantial Completion, Contractor shall have completed the prerequisites to Final Payment specified in the Section on Contract Close-Out and below.

1.04 APPLICATION FOR FINAL PAYMENT

A. When Designer has certified that the Work and needed modifications to the Contract are complete, Contractor shall submit a final application for payment.

B. Submit with the following attachments:

1. Final Continuation sheets described in 1.01 A.2;

2. Contractor’s Affidavit of Payment of Debts and Claims, using AIA Document G706;

3. Consent of Surety Company to Final Payment, using AIA Document G707 or a similarly formed letter, with the original of the Consent attached to the original of the application, and a copy of the consent attached to each copy of the application. If Contractor has listed exceptions in the G706 form, Surety’s consent shall acknowledge such exceptions;

4. A certificate of insurance to the effect of that required by 9.10.2 (2) of the Conditions of the Contract;

5. A written statement to the effect of that required by 9.10.2 (3) of the Conditions of the Contract;

6. A final accounting of the Contract Sum that appropriately allocates the entire Contract Sum to the Divisions of the Specifications. This may follow the same format as the Schedule of Values;

7. Subcontractors and Material Suppliers List, exhibited as Section 01 78 88; and,

8. (When Applicable) Provide Section 01 78 36 Roofing System Warranty, completed, signed and dated by the Roofing System Manufacturer.

1.05 APPROVAL AND PAYMENT

A. Designer, if in disagreement with the amounts claimed in an application, may either return application to Contractor for revision and resubmittal, or revise application by hand to indicate corrections Designer considers appropriate.

B. Designer, finding an application complete and correct, will certify the application and forward one copy to Contractor to indicate the action taken.

END OF SECTION
# PART 1 - GENERAL

## 1.01 ATTESTATION

Contractor shall submit a completed and signed copy of this form with each Application for Payment during the period of this Contract.

<table>
<thead>
<tr>
<th>Project Title &amp; Number:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor Legal Entity Name:</td>
<td></td>
</tr>
<tr>
<td>Federal Employer Identification Number (or Social Security Number)</td>
<td></td>
</tr>
</tbody>
</table>

The Contractor, identified above, does hereby attest, certify, warrant, and assure that the Contractor shall not knowingly utilize the services of an illegal immigrant in the performance of this Contract and shall not knowingly utilize the services of any subcontractor who will utilize the services of an illegal immigrant in the performance of this Contract.

Signature ____________________________ Date ____________________________

Name ____________________________ Title ____________________________

NOTICE: An individual empowered to contractually bind the Contractor MUST sign this attestation. If said individual is not the chief executive or president, this document shall attach evidence showing the individual’s authority to contractually bind the Contractor.

END OF SECTION
SECTION 013000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electronic document submittal service.
B. Submittals for review, information, and project closeout.
C. Number of copies of submittals.
D. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Section 013215 - Progress Schedules and Reports.
B. Section 017000 - Execution Requirements: Additional coordination requirements.
C. Section 017821 - Closeout Submittals: Project record documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
1. Besides submittals for review, information, and closeout, this procedure applies to requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, and any other document any participant wishes to make part of the project record.
2. It is Contractor’s responsibility to submit documents in PDF format.
3. Subcontractors, suppliers, and Designer’s consultants are to be permitted to use the service at no extra charge.
4. Paper document transmittals will not be reviewed; emailed PDF documents will not be reviewed.
5. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

B. Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the contract sum.

C. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Designer and Contractor participating; further training is the responsibility of the user of the service.

3.02 PROGRESS PHOTOGRAPHS

A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.

B. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.

C. Photography Type: Digital; electronic files.

D. Provide photographs of construction throughout progress of Work produced by an experienced photographer, acceptable to Designer.

E. Take photographs as evidence of project conditions.
F. Views:
   1. Provide factual presentation.
   2. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
   3. Point of View Sketch: Provide sketch identifying point of view of each photograph.

G. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
   1. Delivery Medium: Via email.
   2. File Naming: Include project identification, date and time of view, and view identification.
   3. Point of View Sketch: Include digital copy of point of view sketch with each electronic submittal; include point of view identification in each photo file name.
   4. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

3.03 SUBMITTALS FOR REVIEW
A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Designer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 017800 - CLOSEOUT SUBMITTALS.

3.04 SUBMITTALS FOR INFORMATION
A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer’s instructions.
   6. Manufacturer’s field reports.
   7. Other types indicated.

B. Submit for Designer’s knowledge as contract administrator or for Owner. No action will be taken.

3.05 SUBMITTALS FOR PROJECT CLOSEOUT
A. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   5. Other types as indicated.

B. Submit for Owner’s benefit during and after project completion.

3.06 NUMBER OF COPIES OF SUBMITTALS
A. Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
B. For the following submittals requested by the Architect's consultants, also submit the same electronic submission to the applicable consultant when the submittal is made to the Architect. Identify on the transmittal all parties receiving the submittal.
   1. Division 3 sections for concrete, concrete formwork, concrete reinforcement and grout.
   2. Division 5 sections for structural framing and decking.

C. Extra Copies at Project Closeout: See Section 017800.

D. Samples: Submit the number specified in individual specification sections; two of which will be retained by Designer.
   1. Retained samples will not be returned to Contractor unless specifically so stated.

3.07 SUBMITTAL PROCEDURES

A. Transmit each submittal with a copy of approved submittal form.

B. Transmit each submittal with approved form or similar transmittal form.

C. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

E. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

F. Schedule submittals to expedite the Project, and coordinate submission of related items.

G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

I. Provide space for Contractor and Designer review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

K. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

L. Submittals not requested will not be recognized or processed.

END OF SECTION
PART 1 - GENERAL

1.01 SCHEDULING AND ATTENDANCE

A. The Designer, in cooperation with the Owner and the Contractor, will schedule and administer a Pre-Construction Conference, periodic Progress Meetings, and other specially called or required meetings.

B. Representatives of the Owner and the Designer will attend.

C. Representatives of the Contractor, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.02 PRE-CONSTRUCTION CONFERENCE

A. A Pre-Construction Conference will be scheduled and conducted at the project site prior to the issuance of the Notice to Proceed.

B. The Pre-Construction Conference shall be attended by the Contractor's:
   1. (Office) Job Manager,
   2. (Field) Job Superintendent,
   3. Major subcontractors’ representatives,
   4. Major suppliers’ representatives, and
   5. Others, as desired.

C. The Pre-Construction Conference is intended to be an opportunity for the Contractor to review administrative, procedural, and temporary facilities requirements of the Contract Documents, and to ask questions concerning the Work.

1.03 PROGRESS MEETINGS

A. Progress Meetings will be scheduled and conducted at the project site prior to the Contractor's submittal of an application for payment, or when deemed advisable by the Designer.

B. Progress Meetings shall be attended by the Contractor's:
   1. (Office) Job Manager,
   2. (Field) Job Superintendent,
   3. Subcontractors' representatives, as befits the agenda,
   4. Suppliers' representatives, as befits the agenda, and
   5. Others, as appropriate.

C. Progress Meetings are intended to be a monthly opportunity for the Contractor to review and submit applications for payment, and attachments, and for a general review of the progress of the Work, aimed at identifying and mitigating impediments to timely completion.

END OF SECTION
PART 1 - GENERAL

1.01 SUBMITTALS LOG
If any shop drawings, product data, or sample submittals are required by the Contract Documents, maintain a submittals log to record the status of submittals made to the Designer.

A. Submit three (3) copies with each application for payment.
B. Clearly identify the Project by Name and SBC Project Number.
C. Record activities with respect to shop drawings, product data, samples, and such other submittals which are required by the Contract Documents.
D. Indicate for each submittal made to date:
   1. Title or name, and type of submittal;
   2. Date submitted to the Designer;
   3. Date returned by the Designer; and,

1.02 VISITOR LOG
Maintain visitor log in the field office (or with the Project Superintendent when no field office is required) to record visits by all persons not a part of the Contractor's forces, materials suppliers, or subcontractors' forces.

A. Submit three (3) copies with each application for payment.
B. Clearly identify the Project by Name and SBC Project Number.
C. Indicate:
   1. Visitor name and affiliation,
   2. Date of visit,
   3. Time of arrival and departure, and
   4. Company or agency represented and reason for presence.

END OF SECTION
SECTION 01 32 15
PROGRESS SCHEDULES AND REPORTS

PART 1 - GENERAL

1.01 INITIAL PROGRESS SCHEDULE

A. Submit within twenty-one (21) days of award of the Contract, and not later than the date of submission of the first application for payment. Clearly identify the Project on the schedule.

B. Outline the orderly progress of the Work as planned from the Notice to Proceed through Substantial Completion on the contractually required date. Categorize the Work by Phase (if Phases are specified), major work area, and distinct trade or team, and divide into individual activities of one month or less duration each. Provide an identifiable relationship to the schedule of values. Identify projected monthly progress, points of fifty percent (50%) completion and Substantial Completion, and other major milestones.

C. A bar chart or critical path method is acceptable, or other method that is approved by the Designer.

1.02 SUBMITTALS SCHEDULE

A. Submit with the initial Progress Schedule. Clearly identify the Project by Name and SBC Project Number, and format in a manner similar to the initial progress schedule, utilizing the same method, or make a part of the initial Progress Schedule.

B. Identify submittals to be made. Show date for submission and date by which Designer should respond, allowing sufficient time for review.

C. Designer may require revision of schedule if times allotted for review are insufficient.

1.03 UPDATED PROGRESS SCHEDULE

A. Submit three (3) copies with each application for payment.

B. Clearly identify the Project by Name and SBC Project Number. Format in a manner similar to the initial progress schedule, utilizing the same method.

C. Indicate:
   1. Work as initially scheduled,
   2. Actual progress through the period covered by the current application for payment, and
   3. Planned progress through Substantial Completion, including extensions of time made by change order or construction change directive.

D. If actual progress falls behind projections, show how the backlog is to be made up so that the Work will be completed on time.

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Structural submittals include shop drawings, diagrams, illustrations, schedules, performance charts, nomenclature charts, samples, brochures and other data prepared by the Contractor or any subcontractor, manufacturer, supplier, fabricator, or distributor and which illustrate some portion of the Project.

1.2 RELATED SECTIONS

A. Division 1 Sections

1.3 SUBMITTAL PROCEDURES

A. Submittals shall be accompanied by a transmittal letter with the following information:

1. Project name.
2. Contractor’s name.
3. Date submitted.
4. Description of items submitted; identify Work and product by Specification Section.
5. Number of drawings and other pertinent data.

B. Provide blank space on each submittal for the Architect/Structural Engineer’s review stamp.

C. Submit four prints of each shop drawing and four copies of other structural submittals.

D. Contractor shall direct specific attention on the submittal to any deviation from the Construction Documents.

1.4 CONTRACTOR RESPONSIBILITY

A. Contractor shall make all submittals in advance of installation or construction to allow the Architect/Structural Engineer sufficient time for review.

B. Contractor shall review all submittals and shall stamp and sign each sheet of shop drawings and product data and sign each sample to certify compliance with requirements of Construction Documents. SUBMITTALS RECEIVED WITHOUT THE CONTRACTOR’S STAMP OF REVIEW WILL BE RETURNED TO THE CONTRACTOR FOR REVIEW AND RESUBMITTAL.

C. Contractor shall understand that the submittal of the required documents does not constitute compliance with the requirements of the Construction Documents; only submittals reviewed by the Architect/Structural Engineer constitute compliance.

D. It is the Contractor’s responsibility to furnish equipment, materials, and labor for the Project which meets the requirements of the codes and authorities quoted as well as the Construction Documents. Proprietary items specified herein only establish a minimum functional and aesthetic standard and it is incumbent upon the Contractor to ascertain conformance of these proprietary items or any proposed substitution with the codes and authorities.
E. By reviewing, approving and submitting shop drawings, product data, or samples, Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, member sizes catalog numbers, and similar data and that he has checked and coordinated shop drawings with the requirements of the Project and of the Construction Documents.

F. Work requiring shop drawings, whether called for by the Construction Documents or requested by the Contractor, shall not commence until the Architect/Structural Engineer has reviewed the submission. Work may commence if the Contractor verifies the accuracy of the Architect/Structural Engineer’s corrections and notations and complies with them without exception and without requesting change in Contract Sum or Contract Time.

1.5 ARCHITECT / STRUCTURAL ENGINEER REVIEW

A. Architect/Structural Engineer will review submittals with reasonable promptness.

B. Architect/Structural Engineer’s review or corrections refer only to the general arrangement and conformance of the subject of the submittals with the design concept of the Project and with the information given in the Construction Documents. Under no conditions should the Contractor consider the review to include the dimensions, quantities, and details of the items nor the approval of an assembly in which the item functions.

C. Architect/Structural Engineer’s review shall not relieve the Contractor from responsibility for errors or omissions in the submittals.

D. Architect/Structural Engineer’s review of submittals shall not relieve the Contractor of responsibility for any deviation from the requirements of the Construction Documents unless the Contractor has directed specific attention to the deviation at the time of submission and the Architect/Structural Engineer has given written approval to the specific deviation.

E. Architect/Structural Engineer’s review of submittals shall not be construed as authorizing any change in the Contract Sum or Contract Time.

1.6 SHOP DRAWINGS

A. Present in a clear and thorough manner. Title each drawing with Project name and number; identify each element of drawings by reference to sheet number and detail of Construction Documents.

B. Reproduction of Structural Drawings for shop drawings is not permitted. Electronic drawing files will not be provided to the Contractor.

C. Identify field dimensions; show relationship to adjacent or critical features of Work or products.

D. A copy of the marked structural shop drawings with the Architect/Structural Engineer’s review stamp is to be maintained at the job site.

1.7 PRODUCT DATA

A. Submit only pages that are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.
B. Modify manufacturer’s standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information that is not applicable.

C. Provide manufacturer’s preparation, assembly, and installation instructions.

1.8 SAMPLES

A. Submit full range of manufacturer’s standard finishes, except where more restrictive requirements are specified, indicating colors, textures, and patterns.

B. Submit samples to illustrate functional characteristics of products, including parts and attachments as required by Architect/Structural Engineer.

C. Approved samples that are of proper size may be incorporated in Work.

D. Label each sample with identification.

E. Field Finishes: Provide full samples at Project, at location acceptable to Architect/Structural Engineer, as required by individual Specification Section. Install each sample complete and finished. Acceptable finishes in place may be retained in completed Work.

1.9 RESUBMITTALS

A. When submittals are returned to the Contractor with the Architect/Structural Engineer’s corrections the Contractor shall make the required corrections. Upon request, resubmit one corrected set.

B. Contractor shall direct specific attention on the resubmittal to all revisions including those requested by the Architect/Structural Engineer on previous submission.

1.10 DISTRIBUTION

A. Distribute reproductions of shop drawings, copies of product data, and samples which bear the Architect/Structural Engineer’s review stamp to job site file, Record Documents file, subcontractors, suppliers, other affected contractors, and other entities requiring information.

B. Work shall be in accordance with and performed from the reviewed drawings.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION
SECTION 014000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

   A. Mock-ups.
   B. Control of installation.
   C. Tolerances.
   D. Manufacturers' field services.

1.02 RELATED REQUIREMENTS

   A. Document 007200 - General Conditions: Inspections and approvals required by public authorities.
   B. Section 013000 - Administrative Requirements: Submittal procedures.
   C. Section 016000 - Product Requirements: Requirements for material and product quality.

1.03 SUBMITTALS

   A. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor to Designer, in quantities specified for Product Data.
      1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   B. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
   C. Manufacturer's Field Reports: Submit report in duplicate to the Architect within 30 days of observation to Architect for information.

1.04 REFERENCES AND STANDARDS

   A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
   B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
   C. Obtain copies of standards where required by product specification sections.
   D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
   E. Should specified reference standards conflict with Contract Documents, request clarification from Designer before proceeding.
   F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Designer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.
PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION
A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
B. Comply with manufacturers' instructions, including each step in sequence.
C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Designer before proceeding.
D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
E. Have Work performed by persons qualified to produce required and specified quality.
F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS
A. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
B. Accepted mock-ups shall be a comparison standard for the remaining Work.
C. Where mock-up has been accepted by Designer and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

3.03 TOLERANCES
A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Designer before proceeding.
C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 MANUFACTURERS' FIELD SERVICES
A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT
A. Replace Work or portions of the Work not conforming to specified requirements.
B. If, in the opinion of Designer, it is not practical to remove and replace the Work, Designer will direct an appropriate remedy or adjust payment.

END OF SECTION
### PART 1 - GENERAL

#### 1.01 CODES AND REGULATIONS

The Regulatory Requirements used for State Building Commission projects are listed below as a convenience and may not be inclusive of all that apply. Others may also apply. Comply with all pertinent codes, standards, regulations, and laws.

<table>
<thead>
<tr>
<th>DOCUMENT</th>
<th>SOURCE</th>
<th>PHONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. 2011 Tennessee Elevator Code And its Supplements</td>
<td>TN Dept. of Labor and Workforce Development Div. of Boiler &amp; Elevator Inspection 220 French Landing Drive Nashville, TN 37243-1006</td>
<td>(615) 741-2123</td>
</tr>
<tr>
<td>5. 2007 Edition of Boiler and Unfired Pressure Vessel Inspection Law, Rules, and Regulations</td>
<td>TN Dept. of Commerce and Insurance Ch 0780-2-1, Electrical Installations Ch 0780-2-2, Codes and Standards Ch 0780-2-3, Plans and Specs Review Ch 0780-2-18, Equitable Restrooms</td>
<td>(615) 741-7190</td>
</tr>
<tr>
<td>10. Rules of TN Dept. of Environment &amp; Conservation Ch 0400-40-02, Water Resources Regulations Ch 1200-01-18, Lead Based Paint Abatement Ch 1200-01-20, Asbestos Accreditation Requirements Ch 1200-03-09, General Requirements for Construction permits Ch 1200-03-11, Hazardous Air Contaminant Regulation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PART 1 - GENERAL

1.01 CONTRACTOR'S RESPONSIBILITIES

A. Employ and pay for the services of an independent testing laboratory, approved by the Designer, to perform specified services and testing. Employment of laboratory does not relieve Contractor's obligations to perform the Work of the Contract.

B. Coordinate and pay for inspections and testing required by law, ordinance, rules, regulations, orders, or approvals of public authorities as required by the Contract Documents.
   1. Furnish copies of Products Test reports as required.
   2. Furnish incidental labor and facilities to facilitate inspections and tests and for storage and curing of test samples.
   3. Notify the lab sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
   4. Make arrangements with lab and pay for additional samples and tests required for Contractor's convenience.

1.02 TESTING LABORATORY

A. Qualifications
   1. Meet "Recommended Requirements for Independent Laboratory Qualification", published by the American Council of Independent Laboratories, and Basic requirements of ASTM E 329 "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction".
   2. Be authorized to operate in the State of Tennessee.
   3. Submit copies to the Designer of the report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection with the memorandum of remedies of any deficiencies reported by the inspection.

B. Duties and limitations of authority
   1. Perform specified inspections, sampling, and testing of materials and methods of construction and promptly submit five copies of the written report of each test and inspection to the Designer.
   2. Laboratory is not authorized to release, revoke, alter or enlarge on requirements of the Contract Documents, approve or accept portions of the Work, or perform duties of the Contractor.

END OF SECTION
SECTION 015000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Temporary telecommunications services.
   B. Temporary sanitary facilities.
   C. Temporary Controls: Barriers and enclosures.
   D. Security requirements.
   E. Vehicular access and parking.
   F. Waste removal facilities and services.
   G. Project identification sign.

1.02 BARRIERS
   A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner’s use of site and to protect existing facilities and adjacent properties from damage from construction operations.

1.03 INTERIOR ENCLOSURES
   A. Provide temporary partitions as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
   B. Construction: Frame and cover with sheet materials with closed joints and sealed edges at intersections with existing surfaces:
      1. STC rating of 35 in accordance with ASTM E90.
      2. Maximum flame spread rating of 75 in accordance with ASTM E84.

1.04 PROJECT IDENTIFICATION
   A. Provide one Project identification sign of wood frame and exterior grade plywood construction, painted, with exhibit lettering by a professional sign painter, content as follows:
      1. Owner’s name.
      2. Names and addresses of the Architect, Structural Engineer, Mechanical Engineer, Electrical Engineer, Civil Engineer and the General Contractor. If space permits, major subcontractors may also be listed.
   B. Erect on site at location established by Designer.
   C. No other signs are allowed except those required by law

1.05 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS
   A. Remove temporary utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.
   B. Clean and repair damage caused by installation or use of temporary work.
PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 016000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.
B. Transportation, handling, storage and protection.

1.02 RELATED REQUIREMENTS

A. Section 014000 - Quality Requirements: Product quality monitoring.
B. Section 016225 - Product Options and Substitutions.
C. Section 016232 - Substitution Request Form.

1.03 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of beginning of construction.
   2. For products specified only by reference standards, list applicable reference standards.
B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 PRODUCTS

A. Products include material, equipment and systems.
B. Comply with Specifications and referenced standards as minimum requirements.
C. Provide components required to be supplied in quantity within a Specification Section to be the same and interchangeable.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
B. Products Specified by Naming One or More Manufacturers without a Provision for Substitutions: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
PART 3 EXECUTION

3.01 DELIVERY AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials and in ample time to facilitate inspection prior to installation.

B. Transport and handle products by methods to avoid product damage, and in accordance with manufacturer’s instructions. Deliver products in undamaged, dry condition, in the manufacturer’s original unopened containers or packaging, with identifying labels intact and legible.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Upon delivery, inspect shipments to assure:
   1. Products comply with requirements of Contract Documents and approved submittals.
   2. Quantities are correct.
   3. Containers and packages are intact and that labels are legible.
   4. Products are properly protected and undamaged.
   5. Accessories and installation hardware are correct.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

3.02 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

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

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Prevent contact with material that may cause corrosion, discoloration, or staining.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION
PART 1 - GENERAL

1.01 Environmental Hazardous Products, Materials, or Wastes

A. Do not incorporate in the Work hazardous materials or products as currently defined in the Resource Conservation and Recovery Act of 1976 (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), or Environmental Protection Agency (EPA) regulations, rules, or requirements, as amended, and/or State and local regulations, rules, or requirements that are equivalent or more stringent than the Federal regulations, rules, or requirements unless the Contract Documents give no other option than to provide a material or product that contains a hazardous material, component, constituent, waste, or leachate. In studying the Contract Documents and carrying out the Work, report at once to the Designer the discovery of a product or material that contains or is suspected to contain hazardous materials, components, constituents, waste, or leachate. The Contractor will certify all equipment and materials used in fulfillment of their Contract Responsibilities are no Asbestos containing materials.

B. Do not incorporate in the Work a product or material that contains concentrations of a constituent, component, or material above the threshold levels which would require adherence to hazardous waste disposal regulations as currently defined, or could cause a release or threat of release of a hazardous substance at a level that would require a remedial response or removal action as currently defined by RCRA, CERCLA, or the EPA.

C. Select materials and products meeting specified requirements that comply with EPA provisions as regards hazardous materials content. In making requests for substitutions, determine that materials and products proposed for substitution comply with RCRA, CERCLA, and EPA requirements, and supply chemical constituent information and/or Material Safety Data Sheets (MSDS) with the substitution request.

1.02 Substitutions

A. Requests for substitutions shall be submitted to Designer on the form exhibited as Section 01 62 32, or in a similar format that provides the same or more information. Substitute products shall not be ordered or installed without written approval or acceptance from Designer. Contractor assumes all risks associated with premature ordering and installation of substitute products.

B. The specifically named manufacturers, products, and systems, and descriptive characteristics used in the Contract Documents normally serve only to establish a level of quality and a performance standard. Unless specific restriction is placed upon an item in the specifications, Contractor may submit proposals for substitutions. The Owner reserves the right to disallow substitutions. Contractor assumes risks associated with possible rejection of proposals for substitution submitted during the life of the contract.

C. Delays caused by tardiness of Contractor in preparing and forwarding submittals do not constitute an acceptable basis for consideration of substitute products. Delays due to factors that were in effect prior to project bidding do not constitute an acceptable basis for consideration of substitute products.

D. When making requests for substitutions, Contractor assumes the following responsibilities:

1. To have personally investigated the proposed substitute product and determined it is equal or superior in all respects to that specified;

2. To provide the same warranty for substitute that Contractor would for that specified;

3. To provide complete cost data, and waive all claims for additional costs related to substitution which subsequently become apparent; and,

4. To coordinate installation of the accepted substitute, making such changes as may be required for Work to be complete in all respects.

END OF SECTION
SECTION 01 62 32
SUBSTITUTION REQUEST FORM

To: 
Project: 

Attn: 

Specified Item: 
Proposed Substitute: 

1. The following are attached (Mark all that apply):
   □ Complete Description □ Catalog
   □ Laboratory Tests □ Spec Data

2. This substitution will have the following effects on dimensions, gauges, weights, etc.: 

3. This substitution will have the following effects on wiring, piping, ductwork, etc.: 

4. This substitution will have the following effects on other trades: 

5. This substitution will have the following effect on construction Schedules: 

6. The proposed substitute(s) differs from the specified product(s) in quality and performance as follows:

7. Manufacturers guarantees for the substitute(s) and the specified product(s) are (check one):
   □ the same □ different (if different, explain below)

8. Information on the availability of maintenance services and replacement materials for proposed substitute(s) is provided on an attached sheet if applicable. This attachment is:
   □ attached □ not applicable

01 62 32
STREAM June 2014 Std 016232 Substitution Request Form Page 1 of 2
9. Names, addresses, and phone numbers of fabricators and suppliers for proposed substitute(s) are provided on an attached sheet if applicable. This attachment is:

☐ attached  ☐ not applicable

10. If the proposed substitution is accepted, it will result in:

☐ no cost impact  ☐ a cost increase of
☐ a cost decrease of

(If change in cost is indicated, itemization on STREAM June 2014 Std 01 26 50 is attached)

11. License fees or royalties are pending on the proposed substitute.

☐ No  ☐ Yes (if yes, explain below)

12. The undersigned or the firm represented shall pay for additional studies, investigations, submittals, redesign, and analysis by the Designer necessitated by this substitution request.

Submissions must be requested in accordance with applicable Contract requirements. After bidding, substitutions are to be submitted only by Contractor. Substitute products should not be ordered or installed without written acceptance.

Submitted by:  Date:

Name:  Telephone:

type or print:  

for:  E-Mail: 

Address:

Street address:  

and mailing address:  

if different: 

City, State, and Zip Code:  

Designer's Review Comments:

☐ Accepted  ☐ Rejected
☐ Accepted as noted  ☐ Rejected (received too late)
☐ Rejected (submittal incomplete)

Additional comments:

For the Designer:  Date:

Signature here:  ___________________________  ___________________________
SECTION 017000
EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Examination, preparation, and general installation procedures.
B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
C. Pre-installation meetings.
D. Cutting and patching.
E. Cleaning and protection.
F. Starting of systems and equipment.
G. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS
A. Section 011000 - General Information Pertaining to the Work: Limitations on working in existing building; continued occupancy.
B. Section 013000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
C. Section 014325 - Testing Agency Services.
D. Section 017770 - Contract Closeout: Closeout requirements and procedures.
E. Section 017821 - Closeout Submittals: Project record documents, and operation and maintenance data.
F. Section 017900 - Demonstration and Training: Demonstration and training for new elevator systems.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
C. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 PROJECT CONDITIONS
A. Use of explosives is not permitted.
B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
C. Dust Control: Execute work by methods to minimize raising dust from construction operations.
1.06 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section []16225.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.
3.03 PREINSTALLATION MEETINGS
A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
B. Require attendance of parties directly affecting, or affected by, work of the specific section.
C. Notify Designer four days in advance of meeting date.
D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.
E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Designer, Owner, participants, and those affected by decisions made.

3.04 GENERAL INSTALLATION REQUIREMENTS
A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
B. Install products as specified in individual sections, in accordance with manufacturer’s instructions and recommendations, and so as to avoid waste due to necessity for replacement.
C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS
A. Drawings showing existing construction and utilities are based on casual field observation only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Designer before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.
B. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.
   2. Relocate items indicated on drawings.
   3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
      a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
      b. Provide temporary connections as required to maintain existing systems in service.
   3. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
D. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.

E. Adapt existing work to fit new work: Make as neat and smooth transition as possible.

F. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

G. Refinish existing surfaces as indicated:
   1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
   2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

H. Clean existing systems and equipment.

I. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

J. Do not begin new construction in alterations areas before demolition is complete.

K. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-conforming work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 078400, to full thickness of the penetrated element.
J. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.
B. Provide special protection where specified in individual specification sections.
C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.
B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
D. Verify that wiring and support components for equipment are complete and tested.
E. Execute start-up under supervision of applicable Contractor personnel and manufacturer’s representative in accordance with manufacturers’ instructions.
F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 ADJUSTING

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

3.11 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.
B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean filters of operating equipment.

F. Clean debris from roofs, gutters, downspouts, and drainage systems.

G. Clean site; sweep paved areas, rake clean landscaped surfaces.

H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.12 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION
SECTION 01 77 70
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 REQUEST FOR CLOSE-OUT INSPECTION

A. SUBSTANTIAL COMPLETION: When Contractor considers Work substantially complete, Contractor shall submit to Designer:

1. Written assertion that Work is Substantially Complete;
2. A list of items to be completed or corrected and dates scheduled for completion or correction of each item;
3. Certification that orientation and training for facility maintenance personnel is complete or will be prior to inspection; and,
4. Written assertion that Operating and Maintenance Data Binders are complete and available or will be prior to inspection.

B. FINAL INSPECTION: When Contractor considers Work complete, Contractor shall submit to Designer:

1. Certification that a qualified person authorized by Contractor has reviewed the Contract Documents and inspected the Work;
2. Written assertion that the Work is complete and in accordance with Contract Documents and ready for Final Inspection;
3. Written assertion that additional materials necessary to augment the Operating and Maintenance Data Binders with instructions for adding these to the Binders, or full replacement Binders, are complete and available or will be prior to inspection; and,
4. Written assertion that Project Data Binders and Construction Record Documents are complete and available or will be prior to inspection.

C. Upon receipt of an appropriate request for close-out inspection, Designer will schedule an inspection meeting with Contractor, and Owner’s representatives to determine the status of completion.

1.02 RESULTS OF CLOSE-OUT INSPECTIONS

A. Should the Designer determine that Work is not complete to the degree asserted by Contractor, Designer will promptly notify Contractor in writing stating the deficiencies. Contractor shall take immediate steps to remedy deficiencies and make a request for re-inspection.

B. SUBSTANTIAL COMPLETION: Designer will prepare a Certificate of Substantial Completion on AIA Document G704 accompanied by a list of items to be completed or corrected, and will submit Certificate to Contractor and to Owner for signature with an accounting of Liquidated Damages due, when Designer verifies that:

1. Work is Substantially Complete based on an inspection conducted pursuant to an appropriate request for close-out inspection;
2. Orientation and training for facility maintenance personnel is complete; and,
3. Operating and Maintenance Data Binders are complete and have been delivered to the Owner.

C. FINAL INSPECTION: Designer will certify that the Work is Complete, and will initiate Final Adjustments, when Designer verifies that:

1. Work is complete in accordance with Contract Documents based on an inspection conducted pursuant to an appropriate request for close-out inspection;
2. Orientation and training for facility maintenance personnel is complete; and,
3. Additional materials necessary to augment the Operating and Maintenance Data Binders with instructions for adding these to the Binders, or full replacement Binders, are complete and have been delivered to the Owner; and,
4. Project Data Binders and Construction Record Documents are complete and have been delivered to the Designer.

1.03 RE-INSPECTION FEES: If the Work fails a close-out inspection, and a subsequent inspection is requested and conducted based on Contractor assertion of the same stage of completion, Owner will compensate Designer for performing such re-inspection as additional services, and deduct the amount of such compensation from the Contract Sum by appropriate modification.

1.04 FINAL ADJUSTMENTS
A. When Designer has certified that the Work is complete, Designer will determine whether modification is needed to reflect appropriate adjustments to Contract Sum that were not previously effected. If such modification is needed, Designer shall prepare it and deliver it to Contractor, who in the case of a change order, shall sign and return it to Designer.
B. When Designer has certified that the Work and needed modifications to the Contract are complete, Designer will request that Contractor submit a final application for payment.

1.05 ONE (1) YEAR CORRECTIVE INSPECTION
A. A One (1) Year Corrective Inspection will be scheduled and conducted at project site prior to one (1) year from date Substantial Completion was achieved, but as close to the end of that year as is reasonably possible.
B. One (1) Year Corrective Inspection will be attended by at least one (1) representative each of Owner, Designer, and Contractor.
C. One (1) Year Corrective Inspection is intended to be an opportunity for Contractor to become aware of any outstanding corrections needed pursuant to the basic first-year warranty of Work.

END OF SECTION
PART 1 - GENERAL

1.01 DATA BINDERS

A. Provide one (1) complete set and two (2) CD’s in portable document file (.pdf) format. Provide commercial quality, plastic covered, three ring binders. Identify project and type of data on face and side.

B. Provide information required by Contract Documents, including:
   1. Cover sheet giving complete project title and number, Contractor's name, address, phone number, superintendent's name, and related information; and,
   2. Table of Contents to identify material in Binders.

C. OPERATING & MAINTENANCE DATA BINDERS

   1. Provide Product Data, including: manufacturer; model number; names, addresses, and telephone numbers of suppliers, installers, and servicers; related information for repair, renovation, or additions.
   2. Provide Operating and Maintenance Data, including: instructions and schedules for proper operation, maintenance, servicing, and lubrication with manufacturer's parts list, illustrations, assembly drawings, maintenance diagrams, and list of recommended lubricants and cleaning agents; as-installed control diagrams and coordination drawings with color coded piping and wiring diagrams; valve tag charts with numbers, locations, and functions; panel board circuit directories; and, list of materials and parts furnished for Owner.

D. PROJECT DATA BINDERS

   1. Provide required forms completed for supplying data on building systems or assemblies.
   2. Provide a complete list of subcontractors and material suppliers, including dollar amount, company name, address, phone number, local representative, and information regarding diversity-owned business status. This information shall be submitted to Designer on the form exhibited as Section 01 78 88.
   3. Provide Certificate of Substantial Completion, Use and Occupancy Permits, required TDEC permits, and Certificate(s) of Inspection or letter(s) of acceptance from governing authorities as apply.
   4. Provide Contractor's warranty of the work.
   5. Provide Guarantees, Warranties, Bonds, Certifications, Maintenance Agreements, service contracts, and related documents, including beginning date, duration, information about instances which might affect validity, and proper procedure in case of failure.

1.02 CONSTRUCTION RECORD DOCUMENTS

The record copy of Contract Documents and approved submittals required by paragraph 3.11 of the Conditions shall be kept in good condition for submittal to Designer upon completion of construction activity. In the course of the Work, Contractor shall legibly mark these documents to record actual conditions of Work, including: location, depth, and identification of new and existing underground items, location by dimension and identification of utilities, valves, tap points, equipment, service access, test points, and related features, field changes in dimensions and detail, changes by addenda, change orders, and construction change directives, description and details of features for maintenance, service, replacement, or expansion of the Work.

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01 78 88
STREAM June 2014 Std 017888 Report of Subcontractors and Suppliers Page 1 of 1
PART 1 - GENERAL

1.01 COORDINATION

A. Coordinate schedule of demonstration and training with Designer and Owner’s personnel for all installed equipment and systems.

B. If conditions (such as season of year) do not allow for a complete demonstration or training of equipment and systems operation during one meeting session; then coordinate a schedule that shall provide a sufficient number sessions within the warranty period.

1.02 SUBMITTALS

A. Submit an agenda for instruction of Owner’s personnel on installed equipment to Designer not less than one week prior to the scheduled instruction. State number of hours of training time to be provided for each agenda item. State the names and qualifications of persons to provide instruction.

B. For each training event performed, submit two (2) DVD copies documenting the training event with Project Data Binders. Submit each DVD in a standard protective hard plastic container. Label both the DVD and the container to include the full project title and short description of training documented.

C. Submit lists of persons witnessing equipment and systems demonstration, and persons receiving operating instruction. Include copy of lists in the Project Data Binders.

D. Submit lists of spare materials and parts furnished to Owner. Include on lists a written assertion of receipt by Owner’s personnel responsible for receiving the materials and parts.

E. Submit lists of Contractor’s Service Personnel who are to be contacted if problems arise with installed equipment or systems. Personnel named must be familiar with installed equipment and systems. Submit updated lists through the duration of the Warranty period, as needed, if Contractor’s Service Personnel changes.

PART 2 - PRODUCTS

2.01 DVD’s shall be:

A. Format: Provide “Standard DVD” format, and

B. Grade: Provide “Standard DVD” grade.

PART 3 - EXECUTION

3.01 GENERAL

A. Conduct initial demonstration and training as soon as practicable upon installation, and prior to Substantial Completion inspection.

B. Substantial Completion shall not be certified, nor shall Owner be required to assume responsibility for operating, maintaining, or insuring system, prior to initial demonstration and training.

3.02 DEMONSTRATION

A. Demonstrate operation of installed equipment and systems to Designer and to Owner’s representative. All dependent systems must be demonstrated as being operationally coordinate (such as energy management controls coordinate with mechanical equipment.)
B. Demonstration shall be complete and detailed; referencing manufacturer’s printed operating and maintenance instructions, and evidencing all required design specifications.

3.03 TRAINING

A. All training shall be specific to the actual-installed equipment and systems, and be performed by persons approved by equipment manufacturer(s) and/or approved by Designer to conduct such training.

B. Instruct Owner’s personnel with overall equipment and systems assembly and function; using assembly drawings and diagrams which are specific to the actual-installed equipment and systems.

C. Instruct Owner’s personnel in operation, adjustment, and maintenance of equipment and systems; using the manufacturer’s printed operating and maintenance data that is specific to the actual-installed equipment and systems as the basis of instruction.

D. Verify that Owner’s personnel has received all spare materials and parts required to be furnished, and provide instruction in replacement procedures.

E. Record the entire training event

1. Upon initiating recording of an event, camera operator shall announce as a part of the sound recording the date, time, and event being recorded. Operator may take full liberty to provide a narration of the event being recorded.

2. Recording shall be of sufficient quality to provide overall undistorted shading, contrast and focus, and to provide an adequate degree of magnitude so that the event being recorded can be clearly discerned by the viewer.

3. Upon Designer approval, an equipment manufacturer-prepared training DVD which complies to the requirements of this section may be substituted in lieu of recording the actual training session provided for that particular equipment.

F. Approximately thirty (30) days from initial training event, and subsequent other training events, if required, provide a follow-up training event with Owner’s personnel; addressing questions and concerns which have arisen since the initial training (no recording is required).

END OF SECTION
SECTION 024119

DEMOLITION FOR RENOVATION WORK

PART 1 GENERAL

1.01 RELATED REQUIREMENTS
   A. Section 011000 - Summary: Limitations on Contractor's use of site and premises.
   B. Section 015000 - Temporary Facilities and Controls: Temporary closures and barriers and cleaning during construction.
   C. Section 016000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
   D. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.02 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Submit demolition and removal procedures, and schedule.
   C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.03 COORDINATION
   A. Coordinate/comply with the facility's Infection Control Risk Assessment (ICRA).

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 EXISTING UTILITIES
   A. Protect existing utilities to remain from damage.
   B. Do not close, shut off, or disrupt existing life safety systems.
   C. Do not close, shut off, or disrupt existing utility branches or take-offs.
   D. Locate and mark utilities to remain; mark using visible tags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
   E. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.02 SELECTIVE DEMOLITION FOR ALTERATIONS
   A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
      1. Verify that construction and utility arrangements are as shown.
      2. Report discrepancies to Designer before disturbing existing installation.
      3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
   B. Separate areas in which demolition is being conducted from other areas that are still occupied.
      1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000.
   C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.

E. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

3.03 DEBRIS AND WASTE REMOVAL
A. Remove debris, junk, and trash from site. Do not burn or bury materials on the Owner’s property.
B. Remove from site all materials not to be reused on site; do not burn or bury on the Owner’s property.
C. Leave site in clean condition, ready for subsequent work.
D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION
PART 1 GENERAL

1.1 RELATED SECTIONS

A. Division 1 Sections

1.2 REFERENCES


AWS D1.1 – Structural Welding Code.

AWS A5.1 – Specification for Carbon Steel Electrodes for Shield Metal Arc Welding.

AWS A5.5 – Specification for Low-Alloy Steel Covered Arc Welding Electrodes.


AWS A5.20 – Specification for Carbon Steel Electrodes for Flux Cored Arc Welding.

SSPC – Steel Structures Painting Manual.


ASTM A307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.


ASTM F844 – Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.


1.3 SUBMITTALS

A. Refer to Structural Quality Assurance Plan in the Structural Drawings for additional submittal requirements.

B. Shop Drawings:
   1. Contact Structural Engineer’s Construction Administrator prior to detailing structural steel shop drawings.
   2. Shop drawings shall be submitted on a 24” x 36” sheet minimum.
   3. Shop drawings shall clearly indicate the profiles, sizes, ASTM Grade, spacing and locations of structural steel members, including connections, attachments, anchorages, framed openings, sizes and types of fasteners, method of tightening fasteners, cambers, and the number, type and spacing of the stud shear connectors and headed studs.
   4. Beam sizes shall be shown on the erection drawings (plans).
   5. Submit shop drawings for review.
   6. Reproduction of Structural Drawings for shop drawings is not permitted. Electronic drawing files will not be provided to the Contractor.

C. Maintain at construction office written welding procedures for each type of welded joint used in accordance with AWS D1.1.

D. Submit certification that the fabricator meets the required qualifications and ultrasonic testing reports for complete penetration welds. If fabricator has an independent testing agency inspect fabrication as required by these specifications, submit the name and qualifications of the independent testing agency.

E. Upon request, submit the erection sequence and procedures to be used by the steel erector.

1.4 QUALITY ASSURANCE

A. Refer to the Structural Quality Assurance Plan in the Structural Drawings.

1.5 FABRICATOR’S QUALIFICATIONS

A. Steel fabricator shall meet the requirements in the Structural Quality Assurance Plan in the Structural Drawings.

B. For qualification of welders, refer to the Structural Quality Assurance Plan in the Structural Drawings.

1.6 STORAGE

A. Store materials off ground to permit easy access for inspection and identification. Store steel members and packaged items in a manner that provides protection against contact with deleterious materials.
PART 2 PRODUCTS

2.1 ROLLED STEEL SHAPES, PLATES, AND BARS

A. Rolled Steel Shapes, Plates, and Bars: ASTM A36; ASTM A572, Grade 50; or ASTM A992 as indicated by the Structural Drawings. ASTM A572, Grade 50 may be substituted for ASTM A992.

2.2 NON-HIGH-STRENGTH FASTENERS

A. Non-High-Strength Bolts: ASTM A307, Grade A, 60 ksi minimum, where noted on the Structural Drawings.

B. Hardened Steel Washers: ASTM F436.

2.3 HIGH-STRENGTH FASTENERS

A. High-Strength Bolts: ASTM A325 or ASTM A490 as noted on the Structural Drawings. 3/4-inch minimum diameter.

B. Hardened steel washers shall conform to ASTM F436.

C. Spline-Type Tension Control Bolts: ASTM spline-type tension control bolts with plain hardened washers and suitable nuts are an acceptable alternate design bolt assembly.

D. Do not use load indicating washers.

2.4 EXPANSION ANCHORS

A. Expansion Anchors: See Structural Notes.

2.5 SCREW ANCHORS

A. Screw Anchors: See Structural Notes.

2.6 WELD ELECTRODES

A. Weld Electrodes: AWS A5.1, A5.5, A5.17, or A5.20 E-70 series low hydrogen electrodes.

B. Properly store electrodes to maintain flux quality.

2.7 PAINT


B. Paint Primer: Free of lead and chromate and comply with State and Federal volatile organic compound (VOC) requirements.

C. Paint Primer: Compatible with finish coating.
PART 3  EXECUTION

3.1  GENERAL

A. Fabricate and erect structural steel in accordance with AISC Specifications and Code of Standard Practice.

B. Notify Architect/Structural Engineer and Structural Testing/Inspection Agency at least 48 hours prior to structural steel fabrication and erection.

3.2  CONNECTIONS

A. Provide a minimum of two fasteners at each bolted connection.

B. Ensure fasteners are lubricated prior to installation.

C. Provide high-strength bolted connections in accordance with AISC Specifications for Structural Joints using ASTM A325 or A490 Bolts.

D. Provide connections for expansion and contraction where steel beams connect to concrete walls or concrete columns and at expansion joints. Secure nuts on bolts against loosening. (Dent threads with a chisel.)

3.3  FASTENER INSTALLATION

A. Bolts shall be installed in holes of the connection and brought to snug tight condition. Tighten connection progressing systematically from the most rigid part to the free edges of the connection to minimize relaxation of the bolts.

B. High-strength bolts installed shall have a hardened washer under the element turned in tightening.

C. Installation and tightening of bolts shall conform to the AISC Specifications for Structural Joints.

3.4  EXPANSION ANCHOR INSTALLATION

A. Install in accordance with manufacturer’s recommendation and the ICC ESR report for the particular anchor used.

B. Minimum Embedment: See Structural Notes on Drawings.

3.5  SCREW ANCHOR INSTALLATION

A. Install in accordance with manufacturer’s recommendation and the ICC ESR report for the particular anchor used.

B. Minimum Embedment: See Structural Notes on Drawings.

3.6  WELDING

A. Comply with AWS D1.1. Use prequalified weld procedures.

B. Provide end returns where fillet welds terminate at ends or sides. Returns shall be continuous for a distance of not less than two times the nominal size of the weld.
C. Complete penetration joints shall be backgouged to sound metal before the second side is welded or have 1/4-inch root opening with 3/16 x 1 inch backing bar. Access holes are required. Filling access holes is not required.

D. Remove all slag and weld splatter from deposited weld metal.

3.7 CUTTING

A. Do not use flame cutting to correct errors unless authorized in writing.

B. Re-entrant corners shall have a minimum radius of one inch and be free of notches. Notches and gouges resulting from flame cutting shall be finished to a smooth appearance.

3.8 MILL SCALE

A. Remove loose mill scale.

3.9 BOLT HOLES

A. Cut, drill, or punch holes perpendicular to metal surfaces. Do not enlarge holes by burning. Drill or punch holes in bearing plates. Remove burrs.

3.10 PAINTING

A. Paint steel that is not encased in concrete, plaster, or sprayed fireproofing. Do not shop paint in areas to be field welded, contact surfaces of slip critical connections, or areas to receive special finishes.

B. Field paint as required steel that has been welded or that is unpainted after connections have been tightened.

END OF SECTION
PART 1 GENERAL

1.01 RELATED REQUIREMENTS

1.02 REFERENCE STANDARDS


F. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2013.

G. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

H. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2012.

I. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010 w/Errata.


K. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).


1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

D. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.04 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel (AC172).

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.
B. Steel Tubing: ASTM A500/A500M, Grade B cold-formed structural tubing.

C. Plates: ASTM A283.


E. Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, galvanized to ASTM A153/A153M where connecting galvanized components.

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FINISHES - STEEL

A. Prime paint steel items.
   1. Exceptions: Do not prime surfaces in direct contact with concrete, and where field welding is required.

B. Prime Painting: One coat.

2.04 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
C. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Obtain approval prior to site cutting or making adjustments not scheduled.

E. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.


END OF SECTION
SECTION 055213
PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 REFERENCE STANDARDS


E. AWS A5.1 - Carbon Steel Electrodes for Shielded Metal Arc Welding.

F. AWS A5.5 - Low Alloy Steel Electrodes for Shielded Metal Arc Welding.

G. SSPC-Paint 15 - Steel Joist Shop Paint; The Society for Protective Coatings; 1999 (Ed. 2004).


1.02 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E985 and applicable local code.

B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set.

C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set.

D. Allow for expansion and contraction of members and building movement without damage to connections or members.

E. Dimensions: See drawings for configurations and heights.

F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

G. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.
2.02 STEEL RAILING SYSTEM

A. Steel Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black and galvanized finish, as indicated and as specified herein.
   1. Exterior Railings: Galvanize with 1.25 oz/sq ft zinc coating in accordance with ASTM A123.
   2. Interior Railings: Black iron.

B. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.

C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.

D. Rail accessories: Julius Blum, cast iron, as follows:
   1. Acceptable Manufacturers:
      d. Substitutions: See Section 016000 - Product Requirements.
   2. Wall rail brackets: No. 382.
   3. Wall slip rail flanges: No. 610.
   5. Pipe plug: No. 608.

E. Fasteners: No exposed bolts or screws.
   1. Attachment to Wood Blocking: Flat head screws, No. 12, 21/2 inches long.
   2. Attachment to Block Cavities: Toggle bolts.

F. Electrodes: E-70, AWS A5.1 or A5.5

G. Grout: Pre-mixed non-shrink, non-metallic grout complying with Corps of Engineers Specification CRD-C621, with a minimum compressive strength of 7000 psi at 28 days. Use clean potable water, free from elements which might adversely affect grout and embedded items.

H. Galvanizing: In accordance with requirements of ASTM A123/A123M.
   1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.

I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.03 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured.

D. Welded Joints:
   1. Continuously seal joined pieces by continuous welds.
   2. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
   3. If welding is performed after galvanizing, touch-up surfaces with a high quality zinc dust primer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work of this Section.
3.02 PREPARATION
   A. Clean and strip primed steel items to bare metal where site welding is required.
   B. Supply items required to be built into other construction with setting templates, for installation as work of other sections.

3.03 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Install components plumb and to slopes indicated, accurately fitted, free from distortion or defects, with tight joints.
   C. Anchor railings securely to structure.
   D. Wall mounted railings:
      1. Attach railings, rail brackets and slip flanges with specified fasteners sized for the application.
      2. Drill and tap bottom side of pipe and attach to wall brackets with flat head machine screws.
   E. Floor mounted railings:
      1. Set ferrules for railings when concrete is placed.
      2. Set ferrules for railings when concrete is placed.

3.04 TOLERANCES
   A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
   B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION
SECTION 055306

STEEL GRATINGS

PART 1 GENERAL

1.01 REFERENCE STANDARDS

F. ASTM B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold-Finished Bar, Rod, and Wire (Metric); 2012e1.
H. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).

1.02 PERFORMANCE REQUIREMENTS

A. Design Live (Pedestrian) Load: Uniform load of 275 lb/sq ft minimum; concentrated load of 500 lbs.
B. Maximum Allowable Deflection Under Live Load: 1/240 of span or 1/8 inch, whichever is less; size components by single support design.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide span and deflection tables.
C. Shop Drawings: Indicate details of component supports, perimeter construction details, and tolerances.

1.04 QUALITY ASSURANCE

A. Designer Qualifications: Design gratings and plates under direct supervision of a Professional Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
B. Coordinate installation of inserts, welding plates or other means for support framing to either be installed when the concrete is formed or under this Section - Contractor's Option.

PART 2 PRODUCTS

2.01 MANUFACTURERS

B. Alabama Metal Industries Corporation.
C. Fisher & Ludlow.
D. Substitutions: See Section 016000 - Product Requirements.

2.02 MATERIALS
   B. Steel For Welding or Riveting: ASTM A36/A36M, galvanized, of shapes indicated.
   C. Steel Framing: ASTM A36/A36M shapes, unfinished.
   D. Cross Bars: ASTM B211 (ASTM B211M) solid bars.
   E. Welding Materials: AWS D1.1; type required for materials being welded.
   F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
   G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.03 ACCESSORIES
   A. Fasteners and Saddle Clips: Galvanized steel.

2.04 FABRICATION
   A. Fabricate grates and plates to accommodate design loads.
   B. Fabricate support framing for support of gratings.

2.05 FINISHES
   A. Galvanizing for Steel Shapes: ASTM A123/A123M.
   B. Galvanizing for Steel Hardware: ASTM A153/A153M.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that opening sizes and dimensional tolerances are acceptable.
   B. Verify that supports are correctly positioned.

3.02 INSTALLATION
   A. Install components in accordance with manufacturer's instructions.
   B. Place frames in correct position, plumb and level.
   C. Mechanically cut galvanized finish surfaces. Do not flame cut.
   D. Anchor support framing to substrate so that the grating will be continuously supported and level, and so that the top of the grating is flush with the surrounding surface. Make adjustments needed.
      1. Ensure that grating will not cause a tripping hazard or unsafe footing around the perimeter of the grating.
   E. Secure to prevent movement.
   F. Adjust grate supports so that grating is fully supported and will not “rock” in-place.

END OF SECTION
SECTION 061000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 REFERENCE STANDARDS

1.02 DELIVERY, STORAGE, AND HANDLING
A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS
A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS
A. Sizes: Nominal sizes as indicated on drawings, S4S.
B. Moisture Content: S-dry or MC19.
C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS
A. Plywood Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.04 ACCESSORIES
A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M or stainless steel.

2.05 FACTORY WOOD TREATMENT
A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
1. Fire-Retardant Treated Wood: Mark each piece of wood with producer’s stamp indicating compliance with specified requirements.

B. Fire Retardant Treatment:
1. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
   a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
   b. All interior rough carpentry items are to be fire retardant treated.
   c. Treat rough carpentry items as indicated.
   d. Do not use treated wood in applications exposed to weather or where the wood may become wet.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL
A. Select material sizes to minimize waste.
B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 BLOCKING, NAILERS, AND SUPPORTS
A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.03 INSTALLATION OF CONSTRUCTION PANELS
A. Plywood Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.

END OF SECTION
SECTION 071300

SHEET WATERPROOFING

PART 1 GENERAL

1.01 REFERENCE STANDARDS


E. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test); 2008,


H. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2008a (Reapproved 2013).

1.02 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for membrane including the manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

C. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

D. Samples: Submit a minimum of one 12 x 12 inch sample each of waterproofing membrane and protection course.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.03 QUALITY ASSURANCE

A. Membrane Manufacturer Qualifications: Company specializing in waterproofing sheet membranes with three years experience.

B. Source Limitations: Obtain waterproofing materials and protection course through one source from a single manufacturer.

C. Installer Qualifications: Company specializing in performing the work of this section approved by manufacturer.

D. Preinstallation conference: Conduct conference at the Project site. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.04 DELIVERY, STORAGE AND HANDLING

A. Substitutions: See Section 016000 - Product Requirements.
B. Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

C. Store materials between 40 deg F and 90 deg F in a clean dry area in accordance with manufacturer’s instructions. Protect all materials from precipitation and from direct sunlight.
   1. Store membrane on pallets. Cover with breathing tarpaulins if left outside – do not cover with plastic.
   2. Keep away from sparks and flames.

1.05 MOCK-UPS
A. Before beginning installation, mockup 100 sq ft of a wall to receive waterproof system to represent finished work including surface preparation, crack and joint treatment internal and external corners, seam jointing, and protective cover.
B. If the Architect determines mockups are not acceptable, reapply waterproofing until mockups are approved. Rejected mock-ups may not remain as part of the Work - either remove or correct deficiencies in rejected mockups.
C. Approved mockup may remain as part of the Work.

1.06 FIELD CONDITIONS
A. Do not apply waterproofing during inclement weather or when air temperature will not be above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.
B. Do not apply waterproofing to damp, frozen, dirty or dusty surfaces unacceptable to the manufacturer.

1.07 WARRANTY
A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
B. Warranty: Cover materials and installation for failure to maintain watertight conditions for a period of 5 years after the date of Substantial Completion of the Project.

PART 2 PRODUCTS

2.01 MEMBRANE MATERIALS
A. Self-Adhered Modified Bituminous Membrane:
   1. Thickness: 60 mil (0.060 inch).
   2. Tensile Strength:
      a. Film: 5000 pounds per square inch, minimum, measured according to ASTM D882 and at grip-separation rate of 2 inches per minute.
      b. Membrane: 500 pounds per square inch, minimum, measured according to ASTM D412 Method A, using die C and at spindle-separation rate of 2 inches per minute.
   3. Elongation at Break: 300 percent, minimum, measured according to ASTM D412.
   4. Water Vapor Permeance: 0.05 perm, maximum, measured in accordance with ASTM E96.
   5. Low Temperature Flexibility: Unaffected when tested according to ASTM D1970 at minus 20 degrees F, 180 degree bend on 1 inch mandrel.
   6. Peel Strength: 7 pounds per inch, minimum, when tested according to ASTM D903.
   7. Lap Adhesion Strength: 5 pounds per inch, minimum, when tested according to ASTM D1876.
   8. Puncture Resistance: 50 pounds, minimum, measured in accordance with ASTM E154/E154M.
   9. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.
   10. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
   11. Manufacturers:
      d. Substitutions: See Section 016000 - Product Requirements.
2.02 ACCESSORIES

A. Protection Board: Multi-layer internally-reinforced asphaltic panels, 1/4 inch thick, nominal, complying with ASTM D6506 capable of preventing damage to waterproofing due to backfilling and construction traffic.
   1. Products:
      d. Substitutions: See Section 016000 - Product Requirements.

B. Primer: Primer for the installation temperature, with fugitive dye, recommended by the membrane manufacturer for the application.

C. System Accessories: Adhesives, adhesive strips, mastics, termination bars, joint strips, etc., manufactured by the waterproofing manufacturer for the application.

PART 3 EXECUTION

3.01 PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.

C. Patch all holes and voids and smooth out any surface misalignments.

D. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.

E. Prime surfaces to be covered in one working day with applicable primer. Reprime uncovered surfaces next day. If more than 24 hours pass between priming and beginning of waterproofing installation, re-prime such areas.

3.02 INSTALLATION - MEMBRANE

A. Install membrane waterproofing on vertical surfaces of walls and horizontal and vertical surfaces of footings in accordance with manufacturer's instructions for the application.

B. Roll out membrane. Minimize wrinkles and bubbles.

C. Overlap edges and ends and seal by method recommended by manufacturer, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

D. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.

E. Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams.

F. Install flexible flashings. Seal items penetrating through membrane with flexible flashings. Seal watertight to membrane.

G. Seal membrane and flashings to adjoining surfaces.

3.03 INSTALLATION - PROTECTION BOARD

A. Place protection board directly against membrane; butt joints. Scribe and cut boards around projections, penetrations, and interruptions.

END OF SECTION
SECTION 075190

PATCHING EXISTING ROOFING

PART 1 - GENERAL

1.01  SUBMITTALS
   A. Submit items under provisions of Section 013000.
   B. Submit applicable warranty-eligible details of the existing membrane manufacturer.
   C. Also submit certificate stating that the roofing subcontractor performing patching operations is certified and approved by the roofing materials manufacturer.

1.02  DELIVERY, STORAGE AND HANDLING
   A. Deliver items to the site and handle, store and protect under provisions of Section 016000.
      1. Deliver in the manufacturer's original containers, dry, undamaged, with seals and labels intact.
      2. Store materials in weather-protected environment, clear of ground and moisture. Store roll materials on end.

PART 2 - PRODUCTS

2.01  MATERIALS
   A. Roofing membrane: Sheet materials matching that presently installed.
   B. Adhesive: Splicing adhesive recommended by the roof membrane manufacturer for the application.

PART 3 - EXECUTION

3.01  EXAMINATION
   A. Examine surfaces for defects which might adversely affect roof application. Do not begin work until defects are corrected.
   B. Apply roofing materials only when surfaces are absolutely dry. Do not apply material when there is any detectable moisture present.

3.02  INSTALLATION
   A. Splice repair materials to existing in accordance with the roof membrane manufacturer’s instructions for the application. Use warranty-eligible details for splices and terminations.
   B. Clean roof surfaces to be free of foreign matter and debris resulting from work of this Contract. Promptly remove equipment and surplus materials from the site.

END OF SECTION
PART 1 GENERAL

1.01 RELATED REQUIREMENTS
   A. Section 061000 - Rough Carpentry: Wood nailers for sheet metal work.
   B. Section 079005 - Joint Sealers.

1.02 REFERENCE STANDARDS
   C. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2012.

1.03 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.04 QUALITY ASSURANCE
   A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
   B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS
   A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 0.029 inch (22 ga) thick base metal.

2.02 ACCESSORIES
   A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.
   B. Primer: Zinc chromate type.
   C. Protective Backing Paint: Zinc molybdate alkyd.
   D. Solder: ASTM B32; Sn50 (50/50) type.

2.03 FABRICATION
B. Form sections true to shape, accurate in size, square, and free from distortion or defects.

C. Fabricate cleats of same material as sheet, minimum 6 inches wide, interlocking with sheet.

D. Form pieces in longest possible lengths.

E. Hem exposed edges on underside 1/2 inch; miter and seam corners.

F. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

G. Heavily tin solder joints. Soak in solder on all sides. Make up joints at least 2 inches wide. Wipe and wash soldered joints to remove traces of flux immediately after soldering

H. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

I. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

B. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

C. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

END OF SECTION
SECTION 078400
FIRESTOPPING

PART 1 GENERAL

1.01 REFERENCE STANDARDS

1.02 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
F. Certificate from authority having jurisdiction indicating approval of materials used.

1.03 QUALITY ASSURANCE
A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
   2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
   3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
C. Sole Source Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single sole source firestop specialty subcontractor.
D. Installer Qualifications: Company specializing in performing the work of this section and:
   1. Trained by the manufacturer.
   2. Approved by Factory Mutual Research Corporation under FM 4991.
   3. UL approved.

1.04 MOCK-UP
A. Install one firestopping assembly representative of each fire rating design required on project.
   1. Where one design may be used for different penetrating items or in different wall or floor constructions, install one assembly for each different combination.
   2. Where firestopping is intended to fill a linear opening, install minimum of 1 linear ft.
B. Obtain approval of authority having jurisdiction before proceeding.
C. If accepted, mock-up will represent minimum standard for the Work.

D. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

1.05 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING - GENERAL REQUIREMENTS

A. Manufacturers:
   2. 3M Fire Protection Products: www.3m.com/firestop.

B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
   1. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
   2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
   3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.
   4. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install damming materials to arrest liquid material leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authority having jurisdiction.

C. Install labeling required by code.

3.04 CLEANING

A. Clean adjacent surfaces of firestopping materials.
3.05 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION
SECTION 079005

JOINT SEALERS

PART 1 GENERAL

1.01 REFERENCE STANDARDS


1.02 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with other sections referencing this section.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
C. Samples:
   1. Submit 3 samples of backer rods at least 6 inches long.
   2. Submit color charts of the manufacturer’s full range of colors for exposed sealant materials.
D. Manufacturer's Installation Instructions: Indicate special procedures.

1.04 QUALITY ASSURANCE

A. Maintain one copy of each referenced document covering installation requirements on site.
B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 15 years documented experience.
C. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

1.05 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.06 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
B. Installation warranty: Five year installation warranty covering sealants and accessories which fail to achieve air tight and watertight seal, exhibit loss of cohesion or adhesion, or do not cure. Include removal of such materials and installation of new materials at no cost to the Owner.
C. Manufacturer's warranty: Cover the furnishing of sufficient replacement sealant for installed sealant which fails to maintain air tight and watertight seal for the following length of time:
   1. Silicone sealant: 20 years.
   2. Latex sealant: 5 years.
   3. Butyl sealant: 5 years.
PART 2 PRODUCTS

2.01 SEALANTS

A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
   1. Color: To be selected by Designer from manufacturer's standard range.
   2. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.
   3. Products:
      e. Substitutions: See Section 016000 - Product Requirements.

C. Butyl Sealant: ASTM C1311; single component, solvent release, non-skinning, non-sagging.
   1. Color: To be selected by Designer from manufacturer's standard range.
   3. Service Temperature Range: -13 to 180 degrees F.
   5. Applications: Use for:
      a. Under sill flashings below louvers. Set flashings in a full bed.
   6. Products:
      b. Pecora Corporation; BC-158, black or bronze color: www.pecora.com. (Basis of Design)
      d. Substitutions: See Section 016000 - Product Requirements.

D. Silicone Sealant: ASTM C920, Grade NS, Class 25 minimum; Uses NT, A, G, M, O; single component, neutral curing, non-sagging, non-staining, fungus resistant, non-bleeding.
   1. Color: To be selected by Designer from manufacturer's standard range. Use clear where identified below.
   3. Service Temperature Range: -65 to 180 degrees F.
   5. Applications - Exterior: Use for the following:
      a. Dissimilar material joints.
      b. Perimeter of wall openings.
      c. Other locations indicated on the Drawings.
   6. Products:
      d. Substitutions: See Section 016000 - Product Requirements.

2.02 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
   1. Where joints involve EIFS, ensure primer is also approved by the EIFS manufacturer.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
C. Joint Backing: Round open cell polyethylene tubing compatible with sealant; oversized 30 to 50 percent larger than joint width.
   1. Products:
      d. Substitutions: See Section 016000 - Product Requirements.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that substrate surfaces are ready to receive work.
   B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION
   A. Remove loose materials and foreign matter that could impair adhesion of sealant.
   B. Clean and prime joints in accordance with manufacturer's instructions.
   C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
   D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION
   A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
   B. Perform installation in accordance with ASTM C1193.
   C. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
      2. Neck dimension no greater than 1/3 of the joint width.
      3. Surface bond area on each side not less than 75 percent of joint width.
   D. Install bond breaker where joint backing is not used.
   E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
   F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
   G. Tool joints concave.

3.04 CLEANING
   A. Clean adjacent soiled surfaces.

3.05 PROTECTION
   A. Protect sealants until cured.

END OF SECTION
SECTION 081113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 RELATED REQUIREMENTS
   A. Section 087100 - Door Hardware.
   B. Section 099000 - Painting and Coating: Field painting.

1.02 REFERENCE STANDARDS
   B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
   D. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.

1.03 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
   B. Maintain at the project site a copy of all reference standards dealing with installation.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. Store in accordance with NAAMM HMMA 840.
   B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 DOORS AND FRAMES
   A. Requirements for All Doors and Frames:
      1. Accessibility: Comply with ICC A117.1 and ADA Standards.
      2. Door Top Closures: Flush with top of faces and edges.
      3. Door Edge Profile: Beveled on both edges.
5. **Hardware Preparation:** In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.

6. **Finish:** Factory primed, for field finishing.

B. **Combined Requirements:** If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.02 **STEEL DOORS**

A. **Interior Doors, Non-Fire-Rated:**
   1. Grade: ANSI/SDI A250.8 (SDI-100); Level 2 - Heavy-Duty, Physical Performance Level B, Model 2 - Seamless.
   2. Core: Vertical steel stiffeners.

B. **Interior Doors, Fire-Rated:**
   1. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
      a. Provide units listed and labeled by UL (Underwriters Laboratories) - UL (BMD).
      b. Attach fire rating label to each fire rated unit.
   2. Core: Mineral board.

2.03 **STEEL FRAMES**

A. **General:**
   1. Comply with the requirements of grade specified for corresponding door.
      a. ANSI/SDI A250.8 (SDI-100), Level 1 Door Frames: 16 gage, 0.053 inch, minimum thickness.
   2. Finish: Same as for door.

B. **Interior Door Frames, Non-Fire-Rated:** Fully welded type.

C. **Interior Door Frames, Fire-Rated:** Fully welded type.
   1. Fire Rating: Same as door, labeled.

2.04 **FINISH MATERIALS**

A. **Primer:** Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

B. **Bituminous Coating:** Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 **EXAMINATION**

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 **PREPARATION**

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

B. Coat inside of other frames with bituminous coating to a thickness of 1/16 inch.

3.03 **INSTALLATION**

A. Install in accordance with the requirements of the specified door grade standard.

B. In addition, install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.
D. Coordinate installation of hardware.

3.04 TOLERANCES
   A. Clearances Between Door and Frame: As indicated in ANSI/SDI A250.8 (SDI-100).
   B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING
   A. Adjust for smooth and balanced door movement.

END OF SECTION
PART 1 GENERAL

1.01 RELATED REQUIREMENTS
   A. Section 081113 - Hollow Metal Doors and Frames.
   B. Section 087100 - Door Hardware.

1.02 REFERENCE STANDARDS
   A. AWI/AWMAC/WW (AWS) - Architectural Woodwork Standards; 2009.
   D. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

1.03 SUBMITTALS
   A. See Section 013000 - Administrative Requirements for submittal procedures.
   B. Product Data: Clearly describe full compliance with the requirements of the Section, including quality of door construction, core material, face cladding, fire ratings and installation instructions.
   C. Submit identification of the labeling agency and the labeling agency's approved labeling procedures for door construction, including installation of astragals if applicable.
   D. Submit manufacturer's certification that doors meet or exceed specified fire rating requirements.
   E. Shop Drawings: Show the following minimum information. Use the same reference numbers for openings as those indicated on the Drawings. Shop fabrication work tickets are not acceptable submittals.
      1. Door elevations with dimensions.
      2. Hand and swing.
      3. Fire ratings.
      4. Stile and rail construction and reinforcement, mortises and internal blocking for hardware in non-rated and fire-rated doors, and positive pressure provisions for fire-rated doors.
      5. Location and type of provisions in doors for scheduled hardware attachment.
      6. Thickness and type of laminated plastic cladding and crossbands.
      7. Type of finish for all door edges.
      8. Locations and dimensions of cut-outs, holes and mortises.
      9. Type of glazing stops.
     10. Doors with thresholds, undercut bottom edges and other special features.
   F. Specimen warranty.
   G. Warranty, executed in Owner's name.

1.04 REQUIREMENTS FOR RATED OPENINGS
   A. Comply with requirements of the code having jurisdiction for fire rated doors for the rating class indicated.
   B. Ensure metal labels, bearing the name of the labeling agency, are shipped on rated doors, placed between the two upper hinge locations. Paper or plastic labels are not acceptable.
   C. Doors shipped without factory affixed labels will be rejected.
D. Provide with internal positive pressure strips.

1.05 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
B. Manufacturer Qualifications: Manufacturer that is a certified participant in AWI’s Quality Certification Program.
C. Source Limitations: Obtain doors from single manufacturer

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver items to the site and handle, store and protect under provisions of Section 016000.
B. Have doors individually packaged at the factory sealed with heat shrunk plastic, and marked on the top and bottom rails for individual door openings indicated on the Drawings.
C. Deliver doors after the building is enclosed, dry, heated and adequately ventilated. Do not receive or store doors in damp areas. Do not drag the doors on the ground, floor or across one another.
D. Store doors flat on a level surface. Do not lean doors against vertical surfaces. Break sealed plastic packaging to permit ventilation. Do not subject doors to extreme conditions or changes in heat, dryness or humidity (humidity to be no less than 30% and no more than 60%).
E. Do not lean doors against vertical surfaces or store doors on edge. Do not store other materials on top of stacked doors. Do not walk on stacked doors.
F. Handle doors with clean gloves. Do not drag doors across one another or across other surfaces.

1.07 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.
B. Warranty: Replace, including rehanging and refinishing, at no cost to the Owner, doors exhibiting defects in materials and workmanship, including warp (bow, cup, or twist) or delamination, the life of the installation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Doors - General: “Perma-Clad” laminated plastic clad doors by VT Industries, Inc. (vtindustries.com) as specified below for the application:

1. Particleboard Cores: Particleboard (FSC certified Particleboard), ANSI A208.1, grade 1-LD-2, with the following percentage of door construction weight, composed of 70% pre-consumer recycled material.
2. Crossbanding: Rotary cut, single ply, clear grade hardwood, 1/16 inch thick before sanding.
3. Laminated Plastic: NEMA LD3, Type 1 general purpose, 1/16 inch thick.
4. Stiles and Rails: Suitable for hanging on full mortise butt hinges. “Firestop” stiles and rails will not be acceptable for rated doors.
   a. 20-Minute: Structural composite lumber (SCL).
   b. All Label Doors: Include internal intumescent strip on stiles and top rail to meet positive pressure requirements.
5. Edge Bands: Laminated plastic matching faces for stiles. If tops of any doors are visible, also band the top rail.
6. Substitutions: The Basis of Design manufacturer is specified above. Additional manufacturers that are acceptable Subject to compliance with the criteria of Basis of Design product, products of other manufacturers that may be incorporated into the Work are limited to the following:
   a. Algoma Hardwoods, Inc.
   b. Eggers Industries.
   c. Graham Doors.
   d. Marshfield Door Systems, Inc.
   e. Oshkosh Architectural Door Company.
B. Rated Doors:
   1. 20-minute Label Doors: No. 4P04-3.

C. All Doors: See drawings for locations and additional requirements.
   1. Quality Level: Premium Grade, in accordance with AWI/AWMAC/WI Architectural Woodwork Standards.
   2. High Pressure Decorative Laminate Faced Doors: 5-ply unless otherwise indicated.

D. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with NFPA 252, UL 10B, or UBC Standard 7-2-94 ("neutral pressure"); UL or WH (ITS) labeled without any visible seals when door is open.
   3. High Pressure Decorative Laminate Finish where indicated on drawings.

2.02 DOOR AND PANEL CORES

A. 20-Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated above.

2.03 DOOR FACINGS

A. High Pressure Decorative Laminate Facing for Fire Doors: NEMA LD 3, SGF; color(s) as indicated; high gloss finish.

B. Cross Banding Behind High Pressure Laminate Finish: 1 ply; of Rotary cut, single ply, clear grade hardwood, 1/16 inch thick before sanding.

C. Facing Adhesive: Type I - waterproof.

2.04 FABRICATION

A. Fabricate doors to have faces, crossbanding, stiles and cores to match the specified manufacturer’s construction for applicable type of doors. For all labeled doors, include internal intumescent strip to meet positive pressure label requirements.

B. Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

C. Construction: 5 ply with stiles and rails are bonded to core, then entire unit abrasive planed before crossbanding and veneering. Lead-lined doors similar, but with a ply of lead lining on each side of core.

D. Cores:
   1. 20-Minute Doors: Particleboard.

E. Blocking: Provide wood blocking as needed to eliminate through-bolting hardware, but no less than the following:
   1. Doors Indicated to Have Closers: 5-inch top-rail blocking.
   2. Doors Indicated to Have Exit Devices: 5-inch mid-rail blocking.

F. Edge Bands: Apply to conceal crossbanding, Intumescent strips and lead lining, applicable, as well as the transition from the face laminate to the edge band.

G. Bevel strike and hinge stiles 1/8 inch in 2 inches

H. Hardware Preparation: Make cut-outs at the factory from the hardware manufacturer’s templates and approved shop drawings. Pilot drill holes for hardware attachment. Pre-machine doors within industry tolerances, and within the following:
   1. Lock Front Preparation Cutouts: +1/32 to -1/64 inch.
   2. Other Hardware Locations: +1/32 inch.

I. Prefitting: Factory prefit doors for frame opening dimensions identified on shop drawings. Perform any necessary factory trimming before any face or edge laminates are applied. For labeled doors, perform trimming in accordance with labeling procedures. Fit doors for the following clearances:
   2. Floor Clearance: 1/2 inch maximum.

J. Seal top and bottom rails of doors and wood particleboard exposed by cut-outs with high quality preservative
K. Affix metal fire rating labels to door the factory.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes and tolerances are acceptable.

B. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

C. Do not attempt to trim doors on site. Return doors to the manufacturer, or a facility designated by the manufacturer, to have trimming done in accordance with the manufacturer's standard procedures, and in accordance with the manufacturer's approved labeling procedures. Ensure labels, and astragals if required, are installed on rated doors when the doors are returned to the Project site. Replace doors if:
   1. After trimming operations, evidence of trimming exists.
   2. Trimming operations will require new machining for lockset/latchset placement.
   3. Trimming cannot be performed within the guidelines and requirements of the manufacturer's approved labeling procedures.
   4. Doors are returned to the site without affixed astragals if required to be factory installed per the manufacturer's approved labeling procedures.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard. Pilot drill holes for hardware attachment.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Coordinate installation with installation of frames specified in Section 081113 and hardware specified in Section 087100.

D. Installation tolerances:
   1. Maximum Diagonal Distortion (Warp): 1/16 inch measured with a straight edge or taught string, corner to corner.
   2. Maximum Vertical Distortion (Bow): 1/16 inch measured with a straight edge or taught string, top to bottom.
   3. Maximum Width Distortion (Cup): 1/16 inch measured with a straight edge or taught string, edge to edge.

E. Replace doors which are damaged during installation, or as a result of subsequent construction activities.

3.03 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Ensure doors are free from:
   1. Hinge bound conditions, striking or binding.
   2. Rattling when in closed position.

C. If any doors cannot be adjusted to specified conditions, replace such doors and install to meet specified conditions.

D. If any doors are damaged during attempts at adjustment, replace such doors and install to meet specified conditions.

END OF SECTION
SECTION 087100
DOOR HARDWARE

PART 1 GENERAL

1.01 RELATED REQUIREMENTS
   A. Section 081113 - Hollow Metal Doors and Frames.
   B. Section 081423 - Laminated Plastic Faced Wood Doors.
   C. Section 283100 - Fire Alarm System: Magnetic hold-open devices.

1.02 REFERENCE STANDARDS
   B. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 2004.
   C. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; Door and Hardware Institute; 1993; also in WDHS-1/WDHS-5 Series, 1996.

1.03 ADMINISTRATIVE REQUIREMENTS
   A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.
   B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
   C. Convey Owner's keying requirements to manufacturers.
   D. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by all affected installers.
   E. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project. Submit product data for key cabinet illustrating use of cabinet.
   C. Samples: If requested by the Architect, provide samples illustrating style, color and finish of items. Approved samples may be incorporated into the Work provided they are undamaged during the submittal process.
   D. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Include quantity, type, location finish and manufacturer of each item of hardware for each opening. Identify electrically operated items and include power requirements.
   E. Keying Schedule: Submit for approval of Owner.
   F. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
G. Project Record Documents: Record actual locations of as-installed hardware schedule, concealed equipment, services, and conduit.

H. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
   1. Submit manufacturer’s parts lists and templates.
   2. Bitting List: List of combinations as furnished.

I. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

J. Warranty: Submit manufacturer’s warranty and ensure that forms have been completed in Owner’s name and registered with manufacturer.

K. Maintenance Materials and Tools: Furnish the following for Owner’s use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Lock Cylinders: One for each master keyed group.
   3. Tools: One set of all special wrenches or tools applicable to each different or special hardware component, whether supplied by the hardware component manufacturer or not.

1.05 QUALITY ASSURANCE

A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Designer and Contractor.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with 5 years of documented experience.

D. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.07 WARRANTY

A. Locksets and latchsets:
   1. Repair or replace defective sets for a period of 5 years from the date of Substantial Completion.
   2. Provide a lifetime warranty against lever sag.

B. Closers:
   1. Repair or replace defective mechanical components (such as, but not limited to, rack and pinion, seals, arms) for a period of 10 years from the date of Substantial Completion.
   2. Provide a lifetime of building warranty covering replacement of cylinder housing.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Items scheduled in the hardware sets below constitute the "Basis of Design". Refer to the manufacturers listed in this Article for other manufacturers that will be considered for as acceptable.


C. Locksets: Locksets matching existing Corbin Russwin sets outfitted to accept Best Cores, or Best Locksets, keyed to the building’s existing keying system.

D. Closers: Corbin-Russwin, Sargent, Norton, and LCN.
E. Gaskets: McKinney, Pemco, Hager, National Guard.

F. Stops and Other Miscellaneous Scheduled Items: McKinney, Rockwood, and Trimco.

2.02 DOOR HARDWARE - GENERAL

A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.

B. Provide all items of a single type of the same model by the same manufacturer.

C. Provide products that comply with the following:
   1. Applicable provisions of federal, state, and local codes.
   5. All Hardware on Fire-Rated Doors: Listed and classified by UL as suitable for the purpose specified and indicated.
   6. Hardware for Smoke Doors: Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.

D. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.

E. Finishes: Identified in schedule. Finish designations are as listed in ANSI/BHMA A156.18 “American Standards for Materials and Finishes” and are the industry recognized standard commercial finishes. Coat lever handles, hospital latch handles, push plates, handles on pull plates and exit device push bars with “MicroShield” antimicrobial coating.

2.03 MINIMUM REQUIREMENTS FOR CERTAIN ITEMS OF HARDWARE

A. Mortise locksets and latchsets: ANSI A156.13 Series 1000, Grade 1 of design and finish specified in hardware sets at the end of this section. Levers shall comply with ANSI A117.1 Accessibility Code.
   1. Mechanisms: Provide all locking functions with free-wheeling lever mechanisms.
   2. Latch/latch bolts: 3/4 inch throw anti-friction stainless steel latchbolt, and a full 1 inch throw stainless steel bolt for deadbolt functions.
   3. Locks: corrosion resistant, stamped 12 gauge minimum formed steel case and be field-reversible for handing without disassembly of the lock body.
   4. Trim: Knobs, levers, escutcheons, roses to be the product of a single manufacturer
   5. Levers: Solid cast levers without plastic inserts, with each lock lever capable of operating independently and having separate inside and outside lever return springs to prevent sag.
   7. Finish: Include “MicroShield” coating.

B. Touch bar exit devices: ANSI A156.3, Grade 1, push rail design, surface mounted type, closed on all sides and sized to accommodate various door widths, and listed by Underwriters Laboratories and bearing the UL label for life safety in full compliance with NFPA 80 and NFPA 101. Provide operating function with free-wheeling lever handle operation - no knob or thumb piece operation.
   1. Devices used on fire labeled doors: Listed for A Label and lesser class doors.
   2. Panic listing: Listed by Underwriters Laboratories for safety as panic hardware.
   3. Positive pressure requirements: Comply with UL10C.
   4. Chassis: Cold forged steel, electroplated for corrosion resistance, and be architecturally finished brass, bronze or stainless steel.
   7. Pushpad mechanism: Constructed of extruded aluminum and scalped with architecturally finished brass, bronze, or stainless steel. The maximum projection to be 3½ inches when the pushpad is active, and 2½ inches when the pushpad is dogged down.
   8. Rear and active case covers: Wrought brass or bronze, plated to match exit bar.
   9. Latchbolts: Steel with a deadlocking latch for increased security. Devices without deadlocking latches are not acceptable.
11. Through-bolt trims with concealed fasteners.
12. Cycle testing: A minimum of 3,000,000 cycles, witnessed and verified by an independent third party testing lab.

C. Rack and Pinion Closers: ANSI A156.4, Grade 1, ADA/ANSI A117.1, complying with UL 10C positive pressure fire test and be listed by Underwriters Laboratories for use on fire doors, adjustable for sizes 1 through 6 and complying with ADA requirements.
1. Construction: Full rack and pinion with a cold headed heat-treated steel spindle and a sintered steel piston precision machined and heat treated.
2. Piston and spring bores: Minimum 1½ inch diameter. Closers with smaller bores are not acceptable.
3. Closer case: Close grained, porous free cast iron of one piece construction.
4. Valves: Separate tamper resistant, non critical regulating screw valves for back check, latching and closing speed. Provide a separate additional valve for delayed action closers. Valves to be accessible without removing the closer from the door.
5. Backcheck: Provide with an adjustable backcheck intensity valve with a safety feature that automatically releases internal pressure when backcheck has reached the desired adjustment level.
6. Arms: Finely finished, heavy duty forged steel. Wrought mounting plates are not acceptable.
   a. Regular arms: Top jamb.
   b. Parallel arms: Allow for full 180 degree door opening.

D. Cam Action Closers: ANSI A156.4, Grade 1, ADA/ANSI A117.1, complying with UL 10C positive pressure fire test and be listed by Underwriters Laboratories for use on fire doors, adjustable for sizes 1 through 6 and complying with ADA requirements.
1. Design: Cam and roller, one piece cast aluminum silicon alloy body.
2. Piston and spring bores: Minimum 1½ inch diameter. Closers with smaller bores are not acceptable.
3. Closer case: Close grained, porous free cast iron of one piece construction.
4. Valves: Separate tamper resistant, non critical regulating screw valves for back check, latching and closing speed. Valves to be accessible without removing the closer from the door.
5. Backcheck: Provide with an adjustable backcheck intensity valve with a safety feature that automatically releases internal pressure when backcheck has reached the desired adjustment level.
6. Arms: Finely finished, heavy duty forged steel. Wrought mounting plates are not acceptable.

E. Hinges: Non-ferrous material for all exterior doors, and steel plated to match adjacent hardware for all interior doors, unless otherwise indicated in the hardware sets.

F. Stops and other miscellaneous scheduled items: Wrought stainless steel stops with fasteners appropriate to substrate conditions.

2.04 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 quality than specified for applicable hardware units for finish designations indicated.

B. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated:

C. Fastenings: Use fasteners supplied with hardware items. If an item is not supplied with its own fasteners, use appropriate fasteners for the purpose. Provide Phillips flat-head screws. Finish exposed (exposed under any condition) screws to match hardware finish or if exposed in surfaces of other work, to match finish of this other work as closely as possible including “prepared for paint” surfaces to receive painted finish.

D. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt heads or nuts are exposed on opposite face unless their use is the only means of adequately securing the hardware or where required on labeled doors. In no case are thru-bolts to be used as a substitute for proper reinforcement of doors or frames.
2.05 KEYS AND KEY CONTROLS

A. Keying: Key into the Owner's existing keying as directed.

B. Key quantities:
   1. 3 change keys per lockset.
   2. 6 of each Master key and Grandmaster key.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.
   1. Verify that frames are level, plumb and square with a tool such as a PLS Frameset.
   2. Verify that no conditions exist that would prevent the proper installation and operation of hardware items. Do not begin installation of hardware until such conditions are corrected.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.

D. Mounting heights for hardware from finished floor to center line of hardware item:
   1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
   2. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."

E. 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.

F. Gasketing: Where gasketing is scheduled, provide strips to seal all gaps between doors and frame jambs and heads. Make each strip a single continuous length.
   1. Single doors: Provide a strip at both jambs and at the head.

3.03 FIELD QUALITY CONTROL

A. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

B. If inconsistencies are found in the installation of hardware such as, but not limited to, improper installation, unauthorized substitutions of items differing from the approved hardware schedule submittal and other similar inconsistencies, the Owner reserves the right to employ an Architectural Hardware Consultant of his choosing to inspect the hardware on the Project for purposes of determining if the hardware and installation has been furnished and installed in accordance with the requirements of the Contract Documents and the manufacturer's instructions, and to make recommendations to correct inconsistencies found.

C. If the Owner's AHC recommends corrections to satisfy the requirements of the Contract Documents, the hardware installation will be considered as rejected until such corrections are made, and payments for hardware will be withheld from the Contractor's pay requests until the corrections are made.

D. Costs incurred by the Owner relating to the employment of an Architectural Hardware Consultant as specified above will be deducted by Change Order from the Contract Sum.

3.04 ADJUSTING

A. Adjust work under provisions of Section 017000.
B. Adjust hardware for smooth operation.
C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.05 CLEANING

A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.06 PROTECTION

A. Protect finished Work under provisions of Section 017000.
B. Do not permit adjacent work to damage hardware or finish.

3.07 HARDWARE SCHEDULE

A. Manufacturer Abbreviations:
   1. MK - McKinney
   2. RO - Rockwood
   3. RU - Corbin Russwin
   4. BE - Stanley Security Solutions Inc (BE)
   5. PE - Pemko

| Set: 1 |
|---------------------------------|---------------------------------|
| 1.. Hinge                        | TA2714 4-1/2" x 4-1/2"            |
| 2.. Exit Device (surface vertical rod, passage) | ED5470B C910 M55            |
| 2.. Closer (surface)             | DC6210                           |
| 2.. Wall Stop                    | 409                              |
| 1.. Gasketing                   | S88C                             |
| 1.. Astragal                    | 18061C NB                        |

| Set: 2 |
|---------------------------------|---------------------------------|
| 4.. Hinge                       | TA2714 4-1/2" x 4-1/2"            |
| 1.. Mortise Lock (security storeroom) | ML2059 CSA M21            |
| 1.. Cylinder                    | 1E-74                            |
| 1.. Surface Closer              | DCS240                           |
| 1.. Gasketing                   | S88C                             |
| 1.. Sweep                       | 315CN                            |

| Set: 3 |
|---------------------------------|---------------------------------|
| 3.. Hinge                       | TA2714 4-1/2" x 4-1/2"            |
| 1.. Mortise Lock (security storeroom) | ML2059 CSA M21            |
| 1.. Cylinder                    | 1E-74                            |
| 1.. Closer (surface)            | DC6210                           |
| 1.. Wall Stop                   | 409                              |
| 1.. Gasketing                   | S88C                             |
| 1.. Sweep                       | 315CN                            |
**Set: 4**

<table>
<thead>
<tr>
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<tr>
<td>Hinge</td>
<td>TA2714 4-1/2&quot; x 4-1/2&quot;</td>
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<td>Flush Bolt</td>
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<tr>
<td>Dust Proof Strike</td>
<td>570</td>
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<tr>
<td>Mortise Lock (security storeroom)</td>
<td>ML2059 CSA M21</td>
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<tr>
<td>Cylinder</td>
<td>1E-74</td>
</tr>
<tr>
<td>Closer (surface)</td>
<td>DC6210</td>
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<tr>
<td>Wall Stop</td>
<td>409</td>
</tr>
<tr>
<td>Gasketing</td>
<td>S88C</td>
</tr>
<tr>
<td>Sweep</td>
<td>315CN</td>
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**Set: 5**

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<th>Item Description</th>
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<td>Hinge (heavy weight)</td>
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<tr>
<td>Mortise Lock (security storeroom)</td>
<td>ML2059 CSA M21</td>
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<tr>
<td>Cylinder</td>
<td>1E-74</td>
</tr>
<tr>
<td>Closer (surface)</td>
<td>DC6210</td>
</tr>
<tr>
<td>Wall Stop</td>
<td>409</td>
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<td>Gasketing</td>
<td>S88C</td>
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<tr>
<td>Sweep</td>
<td>315CN</td>
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</table>

**END OF SECTION**
SECTION 089100
LOUVERS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS
   A. Section 076200 - Sheet Metal Flashing and Trim.
   B. Section 079005 - Joint Sealers.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
   C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, and frames.
   D. Samples: Submit two samples 2 by 2 inches in size illustrating finish and color of exterior surfaces.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.05 WARRANTY
   A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
   B. Provide twenty year manufacturer warranty against distortion, metal degradation, and failure of connections.
      1. Finish: Include coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Wall Louvers:
      3. Construction Specialties, Inc; Product RS-4300 storm resistant fixed horizontal louver: www.c-sgroup.com. (Basis of Design)
2.02 LOUVERS

A. Louver units: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified under AMCA 511.
   1. Wind Load Resistance: Design to resist positive and negative wind load as required by code without damage or permanent deformation.
   2. Structural Requirements: Design all materials to withstand wind loads as required by the building code. Maximum allowable deflection criteria:
      a. Louver Structural Members: l/180 or 0.75 inch, whichever is less.
      b. Louver Blades: l/120 or 0.50 inch across the weak axis, whichever is less.
   3. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
   4. Wind driven rain performance of a 39.370 x 39.370 inch core area with a rainfall rate of 3 inches per hour and with a wind directed to the face of the louver at a velocity 29.1-mph. Rating effectiveness A = 1 to.99; B =.989 to.95; C =.949 to.8; D =.80 to 0:

<table>
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<tr>
<th>Core Ventilation Rate (fpm)</th>
<th>0</th>
<th>98</th>
<th>197</th>
<th>295</th>
<th>394</th>
<th>492</th>
<th>591</th>
<th>689</th>
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<tr>
<td>Free Area Ventilation Rate (fpm)</td>
<td>0</td>
<td>188</td>
<td>379</td>
<td>567</td>
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<td>A</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>C</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

5. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.

2.03 MATERIALS

B. Insect Screen: 18 x 16 size aluminum mesh.

2.04 FINISHES

A. High Performance Organic Coatings: AAMA 2604; multiple coats, thermally cured fluoropolymer system.

2.05 ACCESSORIES

A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.
B. Fasteners and Anchors: Galvanized steel.
C. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.
D. Sill flashings: 4 inch high x full depth of louver formed from minimum 0.050 inch thick aluminum, with welded side panels.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive work and opening dimensions are as indicated on shop drawings.
3.02 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.
   1. Cut and trim component parts during erection only with the approval of the manufacturer, and in accordance with the manufacturer’s recommendations. Restore finish completely. Remove and replace members where cutting and trimming has impaired the strength or appearance of the assembly.
   2. Do not erect warped, bowed, deformed or otherwise damaged or defaced members. Remove and replace any members damaged in the erection process as directed.

B. Install louveres level and plumb.

C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

D. Secure louver frames in openings with concealed fasteners.

E. Install insect screens fixed to the interior.

F. Installation Tolerances:
   1. Maximum Variation From Plane or Location Shown on the Approved Shop Drawings: 1/8 inch in 12 feet of length, but not exceeding 1/2” in any total building length or portion thereof (non-cumulative).
   2. Maximum Offset From True Alignment Between Two Members Abutting End to End, Edge-to-Edge in Line or Separated by Less Than 3 Inches (Both Load and no Load Conditions): 1/16 inch (shop or field joints).

3.03 CLEANING

A. Strip protective finish coverings.

B. Clean surfaces and components.

END OF SECTION
PART 1 GENERAL

1.01 RELATED REQUIREMENTS
A. Section 061000 - Rough Carpentry: Gypsum sheathing.

1.02 REFERENCE STANDARDS
F. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2011.
G. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
M. ASTM E413 - Classification for Rating Sound Insulation; 2010.
N. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2013.

1.03 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
C. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.04 QUALITY ASSURANCE
A. Copies of Documents at Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.
PART 2 PRODUCTS

2.01 GYP SUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Shaft Walls at Elevator Shafts: Provide completed assemblies with the following characteristics:
   1. Air Pressure Within Shaft: Intermittent loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.
   2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

C. Fire Rated Assemblies: Provide completed assemblies indicated on the Drawings.

2.02 METAL FRAMING MATERIALS

A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
   1. Studs: "C" shaped with flat or formed webs.
   2. Runners: U shaped, sized to match studs.
   3. Ceiling Channels: C shaped.

B. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.

2.03 BOARD MATERIALS

A. Ceiling Board: Special sag-resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Ceilings, unless otherwise indicated.
   2. Thickness: 1/2 inch.

B. Acoustical Sound Dampening Wall and Ceiling Board: Two layers of heavy paper faced, high density gypsum board separated by a viscoelastic polymer layer and capable of achieving STC rating of 50 or more in typical stud wall assemblies as calculated in accordance with ASTM E413 and when tested in accordance with ASTM E90.
   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered.
   3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

C. Shaftwall and Coreboard: Type X; 1 inch thick by 24 inches wide, beveled long edges, ends square cut.
   1. Glass Mat Faced Type: Glass mat shaftliner gypsum panel or glass mat coreboard gypsum panel as defined in ASTM C1658/C1658M.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Products:
      a. Georgia-Pacific Gypsum; DensGlass Shaftliner (mold-resistant).
      b. National Gypsum Company; Gold Bond Fire-Shield Shaftliner XP.
      c. Substitutions: See Section 016000 - Product Requirements.

2.04 ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.

B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.

C. Finishing Accessories: ASTM C1047, galvanized steel, unless noted otherwise.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.
   3. Manufacturers - Finishing Accessories:
a. Same manufacturer as framing materials.

D. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
   1. Tape for glass coated boards: 2 inch wide, coated glass fiber tape for joints and corners.
   2. Tape for paper faced boards: 2 inch wide, creased paper tape for joints and corners.
   4. Chemical hardening type compound.

E. Screws for Attachment to Steel Members Less Than 0.033 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type.

F. Screws for Attachment to Steel Members From 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 SHAFT WALL INSTALLATION

A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
   1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches on center.
   2. Install studs at spacing required to meet performance requirements.

B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.
   1. Seal perimeter of shaft wall and penetrations with acoustical sealant.

3.03 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Suspended Ceilings: Space framing and furring members as indicated.
   1. Level ceiling system to a tolerance of 1/1200.

C. Studs: Space studs as indicated.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

3.04 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   1. Place one bead continuously on substrate before installation of perimeter framing members.
   2. Place continuous bead at perimeter of each layer of gypsum board.
   3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.05 BOARD INSTALLATION

A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board parallel to framing, with ends and edges occurring over firm bearing.
C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.07 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, bedded and finished with chemical hardening type joint compound.


C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Taping, filling and sanding is not required at base layer of double layer applications.

3.08 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION
SECTION 096500
RESILIENT FLOORING

PART 1 GENERAL

1.01 REFERENCE STANDARDS

1.02 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
C. Shop Drawings: Indicate seaming plan.
   1. Where materials have a directional appearance, show direction.
D. Verification Samples for Flooring: Submit samples of each specified color of floor tile. If products other than those specified are proposed, provide a sample of the specified item with the proposed sample. Label samples with finish designations included on the Finish Legend – failure to label as such will be cause for rejection of the submittal for the entire this Section. Note: If the submitted items are not the specified items, not matching the specified colors will be cause for rejection of the submittal for this Section. Submit samples in the following minimum sizes:
   1. 4 x 4 inch.
E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.03 DELIVERY, STORAGE, AND HANDLING
A. Protect roll materials from damage by storing on end.

1.04 FIELD CONDITIONS
A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 TILE FLOORING
A. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness.
   1. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
   2. Thickness: 0.125 inch.
   3. Manufacturers: Manufacturer, series, colors and patterns are indicated on the Drawings.
      a. Substitutions: See Section 016000 - Product Requirements.

2.02 ACCESSORIES
A. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

3.02 INSTALLATION
   A. Starting installation constitutes acceptance of sub-floor conditions.
   B. Install in accordance with manufacturer's instructions.
   C. Spread only enough adhesive to permit installation of materials before initial set.
   D. Fit joints tightly.
   E. Set flooring in place, press with heavy roller to attain full adhesion.
   F. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   G. Scribe flooring to walls to produce tight joints.

3.03 TILE FLOORING
   A. Edge condition of tiles:
      1. Before installing tiles, remove burrs from tile edges by sanding or other appropriate measure.
      2. If any tiles are found to have edges with pits or voids, do not install such edges in the Work – either discard such tiles or use where tiles require cutting, discarding the flawed edges.
      3. Where tiles require cutting, take measures to ensure cut edges are true without burrs, pits or voids.
   B. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer’s instructions say otherwise.

3.04 CLEANING
   A. Remove excess adhesive from floor, base, and wall surfaces without damage.
   B. Clean in accordance with manufacturer's instructions.

3.05 PROTECTION
   A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION
SECTION 099000
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.
B. Field application of paints.
C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Mechanical and Electrical:
      a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.
      c. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne, and lead items.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically so indicated.
   8. Ceramic and other tiles.
   10. Exterior insulation and finish system (EIFS).
   11. Glass.
   12. Concealed pipes, ducts, and conduits.

1.02 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

1.03 REFERENCE STANDARDS


1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "latex" or "stain", etc.).
   2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   3. Manufacturer's installation instructions.
   4. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.
C. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.
D. Manufacturer's Instructions: Indicate special surface preparation procedures.
E. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

F. Maintenance Materials: Furnish the following for Owner’s use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Paint and Coatings: 1 gallon of each color; store where directed.
   3. Label each container with color in addition to the manufacturer’s label.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
   B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience.

1.06 MOCK-UP
   A. See Section 014000 - Quality Requirements, for general requirements for mock-up.
   B. Before proceeding with paint application, finish one complete surface of each color scheme required, clearly indicating selected colors, finish, texture, materials and workmanship. When approved, sample area(s) will serve as the minimum standard of the work of this Section throughout.
   C. Provide door and frame assembly illustrating paint coating color, texture, and finish.
   D. Approved mock-up(s) may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING
   A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
   B. Container Label: Include manufacturer’s name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
   C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer’s instructions.

1.08 FIELD CONDITIONS
   A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
   B. Follow manufacturer’s recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
   C. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
   B. Provide all like paint and coating products from the same manufacturer.
   C. Paints:
   D. Primer Sealers: Same manufacturer as top coats.
   E. Block Fillers: Same manufacturer as top coats.
F. Substitutions: See Section 016000 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each coating material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Chemical Content: The following compounds are prohibited:
   1. Intentionally added methylene chloride or perchloroethylene.
   2. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
   3. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Sheens: Provide the sheens specified.

E. Colors: As indicated on drawings
   1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - INTERIOR

A. Ferrous Metals, Unprimed, Latex, 3 Coat:
   1. 1 coat 90-712 Pitt-Tech Enamel Primer 3.0 mils dry film thickness
   2. 2 coats 9-510 Series Pure Performance S/G Latex 1.5 mils dry film thickness per coat

B. Ferrous Metals, Primed, Latex, 2 Coat:
   1. 1 coat 90-709 Pitt-Tech Enamel Primer 3.0 mils dry film thickness
   2. 2 coats 9-510 Series Pure Performance S/G Latex 1.5 mils dry film thickness per coat

C. Gypsum Board/Plaster, Latex, 3 Coat:
   1. 1 coat 9-2 Pure Performance Latex Primer 1.4 mils dry film thickness
   2. 2 coats 9-411 Series Pure Performance Eggshell 1.5 mils dry film thickness per coat

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

2.05 SPECIAL APPLICATION EQUIPMENT

A. For field finishes of elevator doors and frames, use spray equipment recommended by the paint manufacturer that is capable of applying an electrostatic charge to the paint being sprayed so that the finishes applied in the field create a consistent, smooth and texture-free appearance.
PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of coatings until substrates have been properly prepared.
B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
D. Test shop-applied primer for compatibility with subsequent cover materials.
E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
D. Seal surfaces that might cause bleed through or staining of topcoat.
E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
H. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
I. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-PC 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).
J. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
K. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
B. Apply products in accordance with manufacturer's instructions.
C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
D. Apply each coat to uniform appearance.
E. Sand wood and metal surfaces lightly between coats to achieve required finish.
F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING
   A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION
   A. Protect finished coatings until completion of project.
   B. Touch-up damaged coatings after Substantial Completion.

   END OF SECTION
SECTION 101400

SIGNAGE

PART 1 GENERAL

1.01 REFERENCE STANDARDS


1.02 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer’s printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
   1. When room numbers to appear on signs differ from those on the drawings, include the drawing room number on schedule.
   2. Submit for approval by Owner through Designer prior to fabrication.

D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

E. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

F. Submit certification from the manufacturer that signage will comply with state regulatory requirements regarding character proportion, color contrast and raising/indenting of characters and symbols.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.04 DEFINITIONS

A. Braille: Grade 2 Braille including 189 part-word or whole word contractions in addition to Grade 1 Braille 63 characters. Tactile is required whenever Braille is required.

B. Non-tactile: Letters and numbers on signs with width-to-height ratio between 3:5 and 1:1 and stroke width ratio between 1:5 and 1:10 using upper case “O” and “I” to calculate ratios. Use typestyles with medium weight; upper and lower case lettering is permitted; serif typestyles are permitted.

C. Symbols: Symbol itself is not required to be tactile but equivalent verbal description is required both in tactile letters and Braille.

D. Tactile: 1/32 inch raised capital letters without serifs at least 5/8 inch height and not more than 2 inch height based on upper case “I”. Braille is required whenever tactile is required

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor.

C. Store tape adhesive at normal room temperature.
1.06 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 SIGNAGE

A. Match the existing signage in type and appearance, text to be determined.

2.02 SIGNAGE APPLICATIONS

A. Accessibility Compliance: All signs are required to comply with ADA Standards for Accessible Design and ANSI/ICC A 117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. ADA design requirements:
   1. Signage requiring tactile graphics: Wall mounted signs designating permanent rooms and spaces such as, room numbers and restroom, department, office, and fire exit identifications. Individually applied characters will not be acceptable.
   2. Signage not requiring tactile graphics (but requiring compliance to other ADA requirements): All other signs providing direction to or information about function of space such as, directional signs (signs with arrow), informational signs (operating hours, policies, etc.), regulatory signs (no smoking, do not enter), and ceiling and projected wall mount signs.

2.03 ACCESSORIES

A. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Install neatly, with horizontal edges level.
C. Locate signs where indicated:
   1. Room and Door Signs: Locate on wall at latch side of door with centerline of sign at 60 inches above finished floor.
   2. If no location is indicated obtain Architect's instructions
D. Protect from damage until Substantial Completion; repair or replace damage items.

END OF SECTION
SECTION 102601
ELEVATOR CAB WALL PROTECTION

PART 1 GENERAL

1.01 REFERENCE STANDARDS

1.02 REGULATORY REQUIREMENTS
   A. High-Impact Vinyl Applied as Wall Finish: Tests for determining compliance for surface burning characteristics specified herein must have been performed on the substrates indicated in the Construction Documents as required by NFPA 101, Chapter 10.
      1. Tests performed on material substrates other than the substrates indicated in the Contract Documents will not be accepted as valid tests.

1.03 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Surface Burning Characteristics Tests: Submit test results showing compliance with testing for regulatory requirements specified above.
      1. Any one of the following circumstances will be cause for rejection of the submittals for the work of this Section:
         a. Failure to test products on all actual substrates as specified above.
         b. Failure of the products to achieve the surface burning characteristics specified herein.
         c. Failure to include surface burning characteristics tests as part of the submittal package for the work of this Section.
   C. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.
   D. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Wall Protection:
      1. Manufacturer, type and color are indicated on the Drawings.

2.02 COMPONENTS
   A. Sheet Protection: High impact vinyl.
      1. Performance: Resist lateral impact force of 100 lbs at any point without damage.
      2. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
      3. Size: Thickness indicated on the Drawings in size required by Project conditions.

2.03 FABRICATION
   A. Fabricate components with tight joints, corners and seams.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.

3.02 INSTALLATION
   A. Install in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall substrate.

3.03 TOLERANCES
   A. Maximum Variation From Required Height: 1/8 inch.
   B. Maximum Variation From Level or Plane For Visible Length: 1/8 inch.

END OF SECTION
SECTION 142100

ELEVATOR MODIFICATIONS – TENNESSEE TOWER

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish and install all materials, programming and labor necessary for the elevator modernization herein specified.

B. It is the intention of the Contract Documents to call for finished work, completely tested and ready for the Owner’s operation.

1.02 RELATED DOCUMENTS

A. Section 089100: Louvers to vent shaft. Elevator Contractor will include labor cost to operate the elevator for contractor work associated with this section.

B. Section 092116: Cavity shaft walls.

C. Section 096500: Resilient flooring in cabs with installation specified herein.

D. Section 099000: Finish painting of hoistway doors and frames.

E. Section 260519: Electrical power supplies.

1.03 SUBMITTALS

A. Submit items under provisions of Section 013000.

B. Shop Drawings and Product Data:
   1. Product Data: Submit manufacturer’s technical product data and installation instructions for each principal component or product, and include certified test reports on required testing. List and describe features of control system, performances and operating characteristics.
   2. Shop drawings: Illustrating general arrangement and loads of elevator equipment, plans and other details shall be provided. Shop drawing approval must be obtained before proceeding with the fabrication and installation of components. Upon completion of the work, delivery to the Designer, two complete “as installed/ built” sets of wiring diagrams covering the products installed. The above documentation shall become the sole property of the Owner.
   3. Samples: Submit fixture samples; cover plates, buttons and hall lantern lens samples (as required by the specification).
   4. Maintenance Manuals: Three (3) bound manuals shall be provided for each group of elevators (high and low rise) to be provided in their respective machine room, with operating and maintenance instructions, parts listing, recommended parts inventory listing, purchase source listing for major and critical components, emergency instructions, and similar information.
   5. Diagnostic Tools and Proprietary Information: The Elevator Contractor shall make available to the Owner the option to lease or purchase any diagnostic “hand held” devices that apply to the elevator systems installed herein. Software upgrades shall be offered to the Owner on an annual basis as a condition of lease/ or purchase. Bidders are requested to identify specifically any information contained in their bids which they consider confidential and/ or proprietary and which they believe to be exempt from disclosure citing specifically the applicable exempting law.
   6. The Designer checking and review of Contractor’s and sub-contractor’s drawings or equipment details does not relieve the Contractor from responsibility for errors, omissions, or equipment characteristics furnished in accordance with such checked or reviewed drawings.
7. The checking of Contractor’s and sub-contractor’s drawings or equipment details by the Designer does not give or transfer to the Designer any responsibility for errors or omissions. Where such errors or omissions are discovered later, they shall be made good by the Contractor irrespective of any review by the Designer.

C. Submit product data on the following items:
   1. Signal and operating fixtures, operating panels and indicators.
   2. Cab design and components.
   3. Electronic equipment to control and monitor elevator control functions.
   4. Two-way communications equipment and signage, data plates and other identification devices required by ANSI A17.1.

D. Submit two 4 x 4 inch minimum size samples of materials and finishes required for cab interior, cab ceiling, cab doors, operating and signal system fixtures and finish of hoistway doors and frames. Provide finish samples to be actual finishes on base material to which it is to be installed.

1.04 QUALITY ASSURANCE

A. Manufacture and Install per Industry Standards:
   2. Comply with applicable code sections related to the latest adopted edition for the State of Tennessee.
   3. Comply with applicable NFPA Codes and specifically with the section relating to electrical work and elevators.
   4. Comply with Title III of the American with Disability Act. Design the elevators to comply with requirements for the handicapped, including clearances, handrails, locations of signal equipment, and similar provisions.
   5. Comply with applicable sections of the National Electric Code relating to electrical work and elevators.
   6. Comply with applicable sections of the current Building Codes for the state of Tennessee.
   7. Meet requirements and provide labels (UL and NEC) for electrical equipment and materials wherever standards have been established and label services are regularly furnished by.

B. Manufacturer: Company specializing in manufacturing elevator equipment with 15 years of documented experience.

C. Installer: Employees and supervisor on payroll of the elevator manufacturer or a licensed franchisee of the elevator manufacturer.

D. Comply with ANSI A17.1 and ANSI C2 and as supplemented in this Section.

E. Door and frame assemblies: Comply with NFPA 80 and UL 10B.

F. Welding: Comply with AWS D1.1.

1.05 SUBSTITUTIONS

A. Product Substitution - Certain manufactured articles specified herein are mentioned under one or more trade or manufacturer’s names. These manufactured articles, as specified, shall form the basis of the contractor’s bid. Additional products will be permitted by addendum only.
   1. Articles of other manufacturers, of equivalent design, quality and capacity, as adjudged by the Designer and the Designer’s Consultant, will be considered no later than ten (10) calendar days prior to bid date. Establishing proof of the equality of the product to that specified shall be the responsibility of the bidder. Determination of equality of all products is vested in the Designer, whose decision shall be final and binding upon all concerned. No substitutions will be allowed after the Contract is awarded.
   2. Where a Contractor proposes to use an item of equipment other than that specified or detailed in the specification that requires any re-design of any other part of the mechanical, electrical or architectural layout, all such re-design and all new drawings required therefore shall be prepared by the Contractor, at his own expense. And, should this re-design require additional cost to other Contractors, this expense shall be borne by the contractor making such changes. All changes shall be approved by the Owner.
1.06 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 017821.

B. Include description of the elevator system’s method of operation and control including group supervisory control system, motor control system, door operation, signals, special service provisions, emergency power operation, and special or non-standard features provided.

C. Provide parts catalog with a complete list of equipment replacement parts, with equipment description and identifying numbers.

D. Provide a legible schematic of wiring diagrams covering electrical equipment installed, including changes made in the accepted work of this Section, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.

E. Provide one copy each of the following items behind plastic or glass glazing, in a metal frames, mounted adjacent to each other on a machine room wall in a location which is readily accessible for reference.
   1. Master electrical schematic.
   2. Lubrication chart.

1.07 MAINTENANCE MATERIALS

A. Provide one set of the programming tools and testing equipment required for reprogramming and testing of the elevator controller.

1.08 PREINSTALLATION CONFERENCE

A. Convene a preinstallation conference at least one week prior to commencing work of this Section.

B. Require attendance of persons directly involved with the work of this Section.

C. Review schedule of installation, installation procedures and conditions, and coordination with related work.

1.09 WARRANTY

A. Provide a one year manufacturer’s warranty under provisions of Section 017821, commencing at the date of Final Completion of the Project.

B. Include coverage of the elevator system controller and operating equipment and devices.

1.10 TESTS

A. Provide inspection and testing of elevator system.

B. Obtain and pay for municipal and state permits and inspections required.

C. Conduct tests required by governmental agencies.

D. Schedule tests so that the authority having jurisdiction, the Designer, the Owner and the Contractor are all present during tests.
PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Otis Elevator – 411 / Compass.

B. Schindler Elevator Corp. – TXRG / Schindler ID.

C. KONE Elevator – Resolve / Polaris.

D. Thyssen Krupp - TAC50.

2.02 EQUIPMENT SUMMARY TO BE UPGRADED

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<tr>
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2.03 COMMON TRACTION ELEVATOR ELEMENTS

A. Gearless Traction Machine: Clean, test and re-insulate armatures (blow out, vacuum, brush, etc.), spray with red insulating paint (Glyptal), turn and undercut (machine) commutators and polish to true up surface, clean and test brush holders and rigging assembly, replace brush holder studs and insulators. Elevator Contractor is responsible for all other “refurbishing” of the gearless machines including but not limited to; replace brushes, replace all machine bearings as needed and flush and re-fill oil supplies, scrape and paint machine, thoroughly clean out behind and under machines, etc. All fastenings shall be examined and made secure. If control change requires additional current on motor windings, a blower shall be installed on the hoist machine in such a way to pass air over the field windings. This would be done to lower machine operating temperatures in order to improve performance. Design solid- state units to limit current, suppress noise, and prevent transient voltage feedback into building power supply.
Isolate unit to minimize noise and vibration transmission. Provide isolation transformers, filter networks, and choke inductors.

1. As required, defective solder connections between a commutator segment and motor armature winding shall be renewed. Mica insulation between commutator segments shall be undercut and the commutator resurfaced to provide a smooth concentric brush contact surface. A field coil with outer wrapping that is split or unraveling shall be removed from the hoist machine and rewrapped with an approved insulating material.

2. Note: The elevator machines are to be evaluated by an independent motor shop. Include the cost of this evaluation and standby time to perform said evaluation in scope of this Section. The refurbishment recommendations made by this evaluation are to be included in this scope and all cost associated with these repairs to meet the requirements above are to be the responsibility of the elevator contractor. Include refurbishment cost in unit price on the Bid Form (See also Section 012219).

3. Provide new hoist cables on elevators showing 50% or more of the allowable diameter loss allowed by code. Check sheaves and undercut as needed to minimize wear on new cables.

4. All Units - New rope guards shall be provided to prevent the ropes from leaving the sheave under any condition, with clearance between the guard and sheave to be less than the rope diameter. Install “ascending car over-speed and unintended car movement” devices per Code requirements found in A17.1-2010 or current edition. If current rope guards meet this requirement then they may be retained.

B. Brake: Check and replace brake pins and bushings as required. Rewind brake coils and re-line brake shoes on all elevators as needed. Replace all springs, actuators and contacts, scrape and paint all of the brake assembly (do not paint pins) to match the machine. The elevator shall stop electrically before the brake shoes apply. A system where slow down and normal stopping is achieved by using the brake, will be rejected. A system of controlled emergency stopping with delayed brake application will be rejected. Assure that brake capacity will hold the car at any landing with at least percent of contract load and with minimal counterbalancing.

C. DC (Regenerative) Drives: Provide within new controller cabinets, new high efficiency drives with 0.98 power factor. The drives shall be designed to convert alternating current to direct current and function to vary the D.C. current to the D.C. hoist motor providing smooth acceleration and deceleration regardless of elevator load. Power generated during overhauling load conditions shall be returned to the building power line. Connect resistance in parallel with the motor armature, to absorb regenerated power, when normal drive power is removed from the motor. Drives shall be designed to be fully isolated from car controller signals and equipped with a “fast acting” fuse to protect against current surges. Chokes and transformers, where possible, should be physically located adjacent to the D.C. machine motor (show layout for Designer approval prior to fabrication). Acceptable drives systems shall be functional under varying voltage factors of +/- 10%. Drive control systems shall be closed-loop feedback type based primarily on car position. The velocity profile should be calculated by the individual car computer therefore producing a smooth ride and accurate stopping. A machine mounted velocity transducer, spring loaded shall be used to provide continuous comparison machine speed to velocity profile and to car speed. The position and velocity feedback should permit fast and accurate control of acceleration and retardation not to exceed 5 feet/second/second with an initial ramp up between 0.5 and 0.75 seconds regardless of direction of travel or load in the car. Any over travel or under travel or rope stretch shall be electrically compensated.

D. Micro-Processor Control System: Provide micro-processor control systems as defined under “operation” for all elevators covered under this specification section.

E. Operation: Provide new micro-processor based supervisory and car control system capable of efficient system dispatching. The system shall be capable of determining various traffic conditions and assign corridor calls based upon; number of car calls assigned to each elevator, position and condition of each elevator (location in hoistway), direction of travel, accelerating and decelerating, full speed, elevator in by-pass, and elevator at Lobby with next signal. With minimal building traffic, elevators shall be programmed to zone with at least one elevator at the Lobby floor. The system shall be capable of providing priority service to the Lobby during periods of heavy and light traffic demand. Individual elevators shall utilize group dispatching technology capable of providing the best possible service to the Building. It is the intent of the Owner to have security enabled elevator controls either via lobby card readers or in each car. Contractor is to include in their bid provisions for a card access security feature established after contract award.
1. Provide a Destination Based Elevator dispatching system integrated within the per car control and drive/velocity panel, or separated and housed within an individual control cabinet as may be the standard of the manufacturer. See details below.

2. With submission of this bid include destination dispatch control. This submission should include detailed drawings of LCD touch screens, along with locations and quantities of such, numbering/lettering of units, and all pertinent information for Designer to make a sound decision on. Each contractor is to provide information concerning access control capabilities associated with their system and how it pertains specifically to this application. Include a traffic study comparison of base bid specified system vs. the destination dispatch system to indicate the number of elevators that could be eliminated from the system and still obtain similar handling capacity, wait times and travel times as the seven car base bid operation.

3. The destination based dispatching system shall receive complete data on passenger destination and traffic volumes and always select the best elevator to serve, considering both the boarding and exiting stop (destination), as well as consequential delays suffered by other passengers, both those already in the elevator and those who have yet to board. It shall minimize the number of stops required to handle a given volume of traffic, thus reducing overall passenger travel times and energy consumption. In making this determination the momentary location of the traveling passenger shall be considered by virtue of floor location and the walking distance to the cars from individual input terminals such that no allocation shall be made that would cause the elevator doors to close before the intending passenger could directly approach the elevator.

4. By directing passengers to board specific elevators the system shall permit increases in handling capacity without need for temporary or permanent zoning indicators. During very heavy UP-peak, maximum coincident stopping shall be automatically achieved. Any available capacity of the system is to be applied toward waiting time reduction. Under all traffic conditions, reduced passenger destination times (the sum of waiting + loading + travel times) shall be significant.

5. Passengers will enter their desired destination floor using input terminals provided at each boarding floor. The system shall acknowledge the destination floor by immediately displaying the requested floor number on an integral display screen. After the destination is displayed, the letter designation of the car assigned to the passenger shall be flashed on the display together with the directional symbol indicating the location of the specific elevator. By directing passengers to board specific cars, handling capacity will increase without the need for temporary or permanent zoning indicators.

6. Touchpad fixtures are the primary passenger input terminal devices required for normal elevator operation. The use of traditional up/down corridor call buttons, hall lanterns and in car floor buttons are not needed for normal passenger use and shall not be provided.

7. The destination dispatching system shall have no impact on the normal operation of the base elevator system, namely it shall assure normal operation of Fire Service and other life safety features. All floors shall be designated by numerals and each elevator shall be assigned an alphabetic character.

F. Hoist Cables: All hoist cables are to be re-used, however they must be equally tensioned. Replace hoist cables on Elevators if diameter loss is 50% or more then allowable diameter loss or there is sign of rouge. Verify all cable hitches are wedge type shackles. Load weighing shall be installed either under cab or at the terminus point for the hoist cables on the car top crosshead. Install “ascending car over-speed and unintended car movement” devices per Code requirements found in A17.1- current edition. “Re-groove” traction drive sheave as needed to maintain any new hoist ropes.

G. Counterweight: Elevator shall be suitably counterbalanced for smooth and economical operation. Retain (clean and paint) existing counterweight frame and sub-weights. During balancing secure all sub-weights and isolate them to eliminate any detectable movement. The counterweight shall be equal to the complete elevator car and approximately 40 percent of the specified load. Replace rollers on existing guides, refurbish counterweight roller guides by replacing all bushings and rollers as needed. Install roller guide covers on top guide

H. Compensation: Replace any compensation ropes or Wisperflex that show heavy wear or breaks. Replace any compensation that is cracked or damaged so that it is maintainable. Replace any damaged compensation sheaves and/or replace bearings in sheaves as needed. All compensation chains shall be replaced with wisperflex and new roller dampening installed.
I. Governor, Governor Cable & Tail Sheave: Replace the existing governor and governor cable. Provide new governor cables secured to the safety mechanism. At manufactures option retain existing pit mounted governor tail sheaves and replace bearing. As the car reaches a preset speed in the down direction, the governor will trip, applying the safety, and bringing the car to a smooth and gradual stop. Label each governor with appropriate elevator number as well as identifying up and down direction and which governor is for the car or counterweight.

J. Safety Device: Reuse and refurbish existing car safeties. Clean, lubricate and adjust. Perform rated load test upon completion of the modernization.

K. Wiring: Provide new machinery room and hoistway wiring. All wiring and electrical interconnections shall comply with the governing Codes. Insulated wiring shall have flame retardant and moisture proof outer covering, and shall be suspended to relieve strain on individual conductors. Traveling cables shall be of the round type and constructed with a coax cable in the center and capable of handling a minimum of 10 percent spare conductors and contain 8 pairs of shielded wire. At minimum two cables are to be provided meeting the criteria outlined.

L. Terminal Stops: The elevator shall be equipped with new automatic stopping devices, arranged to bring the car to a stop at the terminal landings independent of the regular operating devices in the car. New final limit switches shall be provided in the hoistway, operated by the car and arranged to stop the car and prevent normal operation should it travel beyond the zone of the normal stopping device.

M. Automatic Terminal Limits: New electric limit switches shall be placed in the hatchway near the terminal landings and designed to cut off the electric current and stop the car should it run beyond either terminal landing.

N. Automatic Self-Leveling: The elevator shall be provided with a two-way, self-leveling feature that will automatically bring the car to the floor landings. This self-leveling shall, within its zone, be entirely automatic and independent of the operating device and shall correct for over-travel or under-travel within 1/4” of floor levels. The car shall also be maintained level with the landing irrespective of the load.

O. Pit Switch: A new emergency stop switch shall be located in the pit accessible from the pit door(s) and at required height. Light switch is to be relocated to 48” above finish floor.

P. Buffers: Refurbish existing buffers. Clean, flush and re-seal. Buffers shall comply with ANSI A-17.1 Code requirements.

Q. Buffer Access: Furnish and install buffer access platform and ladder to access the buffer for maintenance.

R. Car Top Inspection Station: Provide a new car top inspection station with an “emergency stop” switch and with constant pressure “up-down” direction buttons. The device shall make the normal operating devices inoperative and give the inspector complete control of the elevator.

S. Leveling Control:
   1. Leveling devices shall be provided with a position selector integrated with the new micro-processor system. Car position in the hoistway shall be digitized through means of a fixed vane. The position transducer shall permit a 0.25 inch resolution accuracy for the entire length of the hoistway. Floor position and slowdown limit position shall be stored in non-volatile memory (EPROM). The position selector shall also be used to determine the car velocity to within +/- 1%.
   2. An automatic two-way leveling device shall be provided which will govern the leveling of the car to within 1/8”-1/4” above or below the landing sill. Any over travel or under-travel or rope stretch shall be electrically compensated.

T. Operation Under Group Dispatch Failure: If the group controller goes off-line during normal power, the cars shall emergency dispatch in their assigned zones (determined at initialization of system). Cars not assigned during initialization will respond only to car calls. If the group controller goes off-line while on an emergency power source, the car manually selected to run on emergency power will begin to emergency dispatch at the floors assigned to it during initialization.
U. Independent Service: A switch shall be provided in the car operating station, when actuated, shall disconnect the elevator from hall buttons and permit operation from the car buttons only. If the car is on independent service mode when elevator is recalled by means of SES, a buzzer shall sound in the elevator and a jewel shall be illuminated as required by ANSI.

V. Emergency Fire Fighting Operation:
1. Provide an emergency operation system for use by fire fighting or rescue personnel as specified by ANSI A17.1-2010 edition. Switches shall be clearly identified as to function and shall be arranged and designed to prevent unauthorized use or accidental operation being placed behind locked cabinet within the car operating panel as described in ANSI A17.1-2010.
2. Provide keyed switches in panel at the Ground floor in accordance with ANSI A17.1-2010 edition. Provide SES (Safety Emergency Phase I & II).

Note- Hydraulic freight elevator and shuttle elevator (Unit 11) shall be keyed to match modernized elevators for Fire Recall.

W. Special Emergency Service Phase I: Emergency operation to return the elevator to the Ground floor level by means of a key operated switch at the Ground Floor shall be provided in compliance with Code. The key switch shall be mounted integral with new corridor call cover plates- see fixture & signal section.

X. Special Emergency Service Phase II: Within elevator controls of each elevator during the emergency operation, a key switch shall be provided to allow independent use of the elevator by emergency or rescue personnel. Operation as specified by ANSI A-17.1, 2010 edition, shall apply to its operation. Auxiliary contacts in the elevator control panel shall be available for interfacing with the building alarm system.

Y. Elevator capture smoke/ heat devices, and their required power supply: to be zoned as follows; Ground Floor, typical elevator landing corridors, and machine room.

Z. Ascending car over-speed and unintended car movement protection: Protection shall be provided with a device to prevent the car from striking the hoistway overhead structure and to prevent unintended car movement away from the landing with the hoistway door not in the locked position. These safety requirements shall operate and function in accordance with the ANSI A17.1 Code. Rope Gripper device is to be mounted in the machine room or at the top of the hoistway as determined by the successful contractor. Any and all steel, structural reinforcement, anchors or fasteners required to mount this device in the contractor's preferred location shall be by this contractor.

AA. Rails and Brackets: Clean/de-grease rail riding surfaces- main and counter weight, tighten rail bolts and fish plates. Verify rail alignment of horizontal and vertical plumb +/- 1/4 inch for 50 feet linear. Report any variation in rail alignment in order to determine remedial correction.

BB. Roller Type Guide Shoes: Provide manufactures High Performance 10" Diameter high speed roller guide for elevators 1-10. Install guide shoe covers.

CC. Pit Equipment & Car Top Enclosure: Existing pit channels, main car buffer and rails to be painted up to 4’ above the pit floor. Paint pit floor and walls up to 4’ high. Provide a metal car top safety railing on both sides and the rear of the cab, furnish and install an electrical interlock on existing top exit panel (enlarge top exit panel opening if required to meet current code). Scrape and paint existing cab platform, stiles, framing, car top and exterior metal cab shell.

DD. Interim Traffic Manager – During the modernization process and after the first elevator is completed and returned to bank operation provide an interim traffic dispatch system that will coordinate dispatching of the elevators between the new and old system. The ITM/Cross Cancellation will stay in place until the last elevator is removed for modernization.
EE. Master Phone Station – Provide a master Rath phone / intercom station adjacent to the status panel or incorporated in the panel at the fire command room. Reuse current conduit for all wire. If additional conduit is required then elevator contractor must include the cost in their bid for an electrician to provide.

FF. Elevator 11: Retain existing controller, machine, drive and motor and provide updated to cab interiors and car fixtures as specified below.

2.04 ADDITIONAL CONTROL PROVISIONS (Elevators 1-10)

A. Nudging Action: If door opening is obstructed for a predetermined adjustable time (20-30 seconds), a buzzer shall sound and attempt to close doors with a maximum of 2½ foot pounds kinetic energy. Allow door to close after obstruction is removed.

B. Differential Door Time: Provide separately adjustable timers to enable varying time that the doors remain open after stopping in response to calls. In response to a car call- adjustable between 1 to 8 seconds; landing call- adjustable between 3-8 seconds. Use landing call timing when responding to coincidental calls.

C. Hoistway Access Switches: An enabling key switch shall be provided in the car operating panel to render all car and hall buttons inoperative and to permit operation of the elevator by means of an access key switch adjacent to the hoistway entrance at the access landing. The movement of the car away from the access landing, other than the lower terminal, by means of the access key switch at the landing shall be limited in travel and direction to that as specified for the upper landing in the latest revision of the ANSI/ASME A-17.1 Code. Contractor to include all cutting and patching for this new fixture. This is not included in related work by others.

D. Out of Group Operation: In the event that a car does not start for a hall call dispatch signal, the car will be removed from group operation after 20 seconds.

E. Auto Light Fan Shutdown: If an elevator has been removed from dispatch operation due to lack of traffic demand and attained a resting zone assignment, power shall be disconnected to the car light and fan circuits. An assignment to the “resting car” will immediately restore electrical circuits to normal operation.

F. Load Weighing: Load weighing switches/cells shall be provided which will function to bypass hall calls when their respective load weighing inputs are energized. Bypass should be established at a setting of 70% of rated load capacity. Load weighing may be used for sensing traffic conditions and used as a parameter to determine dispatching strategy, establish a setting of 50% of rated load capacity for this feature.

G. Inconspicuous Riser: Provide an IR feature for elevator 1 so that the single push button riser located at elevator 1 can be run independently from this push button riser. Note that a new set of fixtures is to be provided for this riser. The system will need to have the capability to be turned on and off by a time clock and overridden via key switch located at the 1st floor or through the EMS system. This elevator will be required to have a conventional car operating panel that can be used when the elevator is on IR.

H. Elevator Management System (EMS): Supply a hardware and software monitoring system conforming to the following requirements. Provide an integrated display system as manufactured by the approved elevator contractor. Provide a minimum Pentium IV Intel Computer (with Microsoft program), and 17” VGA flat panel color monitor and printer. Elevator position, door position, elevator status, group status, car calls and hall calls shall be displayed. Provide visual and audible signal in the event an elevator is removed from service.

1. Provide means to remove elevators from service, inhibit hall and car calls on an individual basis. The system processor shall be capable of providing log of events which affect the operation of the elevators, including events indicating elevators are not removed from service. Provide record of hall call durations. Records shall be stored in 15- minute increments with a minimum of 30 days of data stored in one file. Provide a means to print summary of events and monitoring data. Provide one unit at the security desk and one unit at engineering.
I. Building Security Integration: Contractor should provide with their bid, their proposed solution for integrating the Lobby Level keypads (Floors 1-4) with the existing building security system. Bidders should include with their bids, their products ability to integrate with the buildings equipment, proposed locations of the elevator keypads and proven installations to justify such locations, quantities of keypads if above or below the four (4) required by this specification and the security related capabilities of their specific system that should be considered with this proposal. If keypads are capable of housing card reader, include such devices in the Bid and provide detail information.

2.05 SIGNAL EQUIPMENT

A. General: Except as otherwise indicated, provide manufacturer’s custom signal equipment for each elevator or group of elevators. Provide new car control stations (main and auxiliary), car position indicator in each car to replace existing, hall push-button stations on each landing (two separate push button risers per bank).

B. Car Control Stations: Provide new flush-mounted metal panels, containing call buttons for each landing served, and containing other buttons, switches and controls required for specified car operation and control. All call buttons to be custom designed and illuminated. Manufacture and mount at height complying with “ADA Minimum Requirements for the Handicapped”, including hands free phones. Provide operating device symbols as required by Code. Mark other buttons and switches with identification for required use or function. COP’s should come from the factory with engraving identifying the Elevator Number at the top. The car operating panel is to be integral and a part of the swing returns. No face plate is permitted and the finish of the return and fixtures is to match existing. Car Control Stations (1-10 only): Conventional car buttons for the selection of destination floors are not required with destination based dispatch control (except IR Elevator 1). Local code may vary in some areas and shall apply, but normally each car with destination dispatch control shall be provided with one or two car operating panels comprising of:

1. Main COP
   - Car position indicator
   - Alarm button
   - Emergency light
   - Door open button
   - Door close button
   - Phase 2 fire access controls
   - Hidden car call panel

2. Auxiliary COP
   - Car position indicator
   - Alarm button
   - Door open button
   - Door close button
   - ADA telephone
   - Auxiliary switches

3. Designation Indicators: Digital designation indicators are to be located in both swing return jambs (Main and Auxiliary side).

4. The hidden car call panel houses car call buttons for use in Fire Service Operation and Independent Service. During normal operation, these buttons are not accessible, but are automatically made available during life safety and independent control modes via a self-releasing door latch. Where the size of the elevator and doors precludes two COP’s, a single COP shall include all mandatory functions and the hidden car call panel.

5. Provide new car operating panel for elevator 1 when on IR.
C. **Corridor Call Stations:** Provide two (2) keypads located in the same location as the current push buttons at all floors per bank. Provide four (4) keypads at floors 1, 2 and 3 per bank. Note that a total of 4 keypads at these floors are to be global (2 low rise, 2 high rise and 4 global). Provide with the bid packet proposed locations of these fixtures at these floors to most suitably accommodate the building's traffic flows. Approximate locations are indicated on the Drawings.

1. Each floor terminal shall consist of a 12 - button LCD touchscreen input panel and a multi digit LCD display using bright characters, at least 3/4" (19mm) high. Passengers shall select their destination by pressing the appropriate number buttons corresponding to the required destination. The lobby floor is to be designated as "1". Two (2) - digit numbers should be included by pressing one button only. A button with the "star" symbol is provided for main egress. Pressing the * key, and no other key, inputs a call to the main lobby (egress floor).

2. Each floor input terminal shall include the decade input buttons, a display and voice output for handicap usage and ADA compliance.

3. As required under CABO /A117.1, a large button, equivalent to the width of 3 input buttons is located under the floor input buttons to activate features designed to aid people with visual disabilities. The operation of this feature is described in section 2.5.F.

4. Only legitimate destinations shall be indicated and transmitted from the keypad to the control system via the serial data link. Invalid calls or commands that are not possible at the time of entry shall prompt a "??" or "***" symbol indication on the display screen, without transmission to the control system.

D. **Hall Lanterns:** Remove existing hall lanterns and utilize these locations to install fixtures as referenced below. Provide any faceplates necessary to cover existing lanterns.

E. **Lobby PI:** Replace any corridor position indicators with new LED 2.5” Digital PI fixture to cover existing. Use flush fixture and not surface mounted.

F. **Entrance Enunciators/Designation Plates-** Car identifying plaques, “Hall Enunciators” (A to J) shall be provided permanently above or adjacent to the elevator doors in a location permitting clear identification of the elevator. Each plate must be custom and approved by owner. In normal service of the enunciators is active (illumination only), but under handicap operation they shall generate specific audible (tone and voice) confirmation of the elevator assigned the call.

G. **Handicap Operation-** In addition to the numeric buttons, each floor terminal is to be supplied with a button designated with the International Handicap Access wheelchair symbol. This button is to be the initiating button for handicapped passenger procedures. If the "wheelchair" button is pressed, this will initiate a special journey mode.

1. The destination is registered in the conventional manner.

2. Car allocation is confirmed both visually and by a 2nd tone that is repeated at the entrance enunciator of the elevator assigned that call. The floor enunciator is illuminated and flashes to coincide with the audible signal at the input terminal confirming to partially sighted and blind persons which car has been assigned. The assignment is announced at the terminal e.g. “take car A” and car A announces its location.

3. The allocated car will be selected according to:
   a) Space inside the elevator to permit a wheelchair user to board, nominally 4 persons but variable.
   b) ETA of the elevator must be later than the ETA of the passenger at the boarding entrance, assuming an extended 2-3 seconds per yard passenger approach time.
   c) Preference for no exiting passenger for the boarding floor.

4. Upon arriving at the ingress floor and after opening the doors the elevator shall announce the open status of the doors and automatically extend the dwell (non-interference) time by 5 seconds (variable) to permit comfortable access. System shall send a signal to the door operator and will initiate a slow closing of the doors.

5. Upon arrival at the egress floor the system shall announce the floor number followed by confirmation of door open status.

6. After the extended door dwell time, the car shall return to normal service.

H. **Ground Floor Fire Command Panel:** Provide a new fire command and emergency power selection panel to replace the existing in the fire command room. New panel shall cover existing and be flush or boxed in for a finished appearance. Panel shall include PI and required switches as well as master phone station to allow emergency
personnel to communicate to each elevator. Include master phone station to access all elevators via the Rath or equal phone / intercom.

I. Emergency Signal Bell: A new car emergency signal bell shall be provided of the “monitor type” suitable for outlet box mounting. The bell shall be arranged to sound when the emergency button in the car is pressed. The bell shall be mounted in the hoistway at the lowest landing.

J. Audible Signal: Provide in-car voice enunciators for passengers with disabilities.

K. Emergency Car Lighting: An emergency power unit employing 1 12-volt sealed rechargeable battery and totally static circuits shall be provided that shall illuminate the elevator car and provide current to the alarm bell in the event of normal power failure. The equipment shall comply with the requirements of the ANSI/ASME Code.

L. Cab fan: Furnish and install a new 2-speed Morrison type cab fan.

2.06 SPECIAL DESIGN CRITERIA

A. Design for the handicapped:
   2. Locate uppermost button in the cab control panel and the centerline of the telephone handset to be not more than 48 inches above the cab floor.
   3. Sound audible soft-tone signal in car when car is stopping or stopped at a floor.
   4. Provide hall gongs which sound once for up stops and twice for down stops.
   5. In each cab, provide \( \frac{3}{8} \) inch high Arabic numerals raised .03 inches from the surface and Braille numerals immediately to the left of floor buttons to identify floor.
   6. At each floor landing, provide 2 inch high Arabic numerals raised .03 inches from the surface and Braille numerals on each door frame if not existing.

2.07 MATERIALS

A. Rolled steel sections, shapes and rods: ASTM A36.

B. Sheet steel: ASTM A446, Grade B, zinc coated to ASTM A526 G90 coating designation.

C. Stainless steel: ASTM A167, Type 304, No. 4 finish.

D. Aluminum: Anodizing quality, alloy as follows:
   1. Extruded material: ASTM B221 6063.
   2. Sheet material: ASTM B209 5005

E. Plywood: APA rated sheathing, 32/16 span rating, Exposure 1, sanded, fire retardant treated.

F. Particleboard: CS 236 high density type, composed of wood chips and waterproof resin binders, of grade to suit the application, with sanded faces.

G. Wall Protection: Refer to TT F1.01.

H. Primers:
   2. Plain steel surfaces: Zinc chromate alkyd type.
   3. Wood surfaces: Alkyd primer sealer

I. Paint: Semi-gloss alkyd enamel of colors selected.
2.08 CAR DOOR OPERATION AND CONTROLS (ELEVATORS 1-10)

A. Door Operator: Furnish and install a new direct current "closed-loop", motor-driven, heavy duty operator, designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel, and the door operating mechanism shall be arranged for manual operation in event of power failure.
1. The leading edge of each leaf of the car door shall be provided with a retractable reversal edge arranged to automatically return car and hoistway doors to the open position in the event the doors are obstructed during closing cycle. Doors will then resume closing cycle. Doors shall automatically open as the car arrives at the landing, and shall automatically close after an adjustable time interval or when the car is dispatched to another landing. Direct drive geared operators, A.C. controlled units with oil checks, or other deviations from the above are not acceptable. Provide MOVFR type operator or manufacturer’s equivalent.

B. Interlocks: Retain and recondition all hoistway door interlocks. All locks are to be rebuilt and cleaned. Rebuilt includes replacing contacts and springs. Furnish and install new clutches and vanes, springs and keepers. Properly adjust for smooth and trouble free operation. Replace all closers as necessary and replace car gate switches with new. Install new relating cables as needed. Install new clutch / Bayonet.

C. Car Door Hangers and Tracks: Provide new car doors, new hangers and car door tracks. Clean surfaces and tighten bolts and related hardware that are re-used. Provide new polyurethane rollers with ball bearings properly sealed to retain grease. This scope includes replacement of all car doors.

D. Door Zone Restriction Devices: Provide door open restriction devices on all doors per ANSI/ASME A17.1 Code. Doors will be mechanically restricted from opening unless the elevator car is in the designated unlocking zone. Hatch latch restrictors are acceptable unless an alternative is available with reduced gap condition.

E. Static Type Door Edges: Provide new non-retractable proximity type door edges that, upon sensing an obstruction in the entrance within a range of 5 inches causes doors to stop and reopen. Door detector devices as manufactured by Janus “Pana 40 3D” and/ or approved equal. Door close shall be arranged to start within a time consistent with ADA requirements from notification that a car is answering a hall call. Doors shall be arranged to remain open for a time period sufficient to meet ADA requirements.

2.09 HOISTWAY ENTRANCES

A. Hoistway Door Panels & Frames: Re-use existing in place. All doors to have hoistway escutcheon access keyway. All hatch doors to have sight guards securely installed. Replace broken or damaged sight guards. See drawings for painting schedule.

B. Hoistway Door Tracks and Hangers: Replace all hatch door hangers/rollers. Hatch door tracks are to be retained. Unit Price add- provide a unit price add to replace hatch door tracks and hangers per opening.

C. Sight Guards: Each Door is to have a secure sight guard.

D. Hoistway Sills: Reuse existing in place. Clean and polish including hoistway side of sill.

E. Fascia Plates: Reuse existing in place. Clean, wire brush and repaint with a rust inhibitive primer. Stencil floor markings with 4” high lettering.

F. Dust Cover: Reuse existing in place. Clean, wire brush and repaint with a rust inhibitive primer.

G. Toe Guard: Remove existing and replace with new extended (48”) toe guard per A17.1 ANSI Code- 2010 edition.

H. Handicapped Jamb Marking: Re-use existing in place. On entrances missing Braille plates install new. All Plates must be matching and have a contrasting background.
I. Lobby Pictograph: At all landings, if not existing, provide code compliant elevator corridor call station pictograph “In Case of Fire Elevators are out of Service”. Finish to be stainless to match corridor keypads.

J. Headers: Reuse existing in place. Clean and tighten bolts and other related hardware.

K. Hostway Door Astragals - Replace any damaged rubber astragals with new.

L. Struts: Clean and tighten.

M. Hangers & Tracks: Retain existing hangers, install new nylon track guides where applicable. Replace rollers with new polyurethane rollers with ball bearings properly sealed to retain grease. Provide unite price per opening to replace hatch door track and hanger.

N. Interlocks: Refurbish and rebuild existing hoistway door interlock. If contractor has an alternative for close coupled door please provide cost for replacing locks with new.

2.10 CAR ENCLOSURE (ELEVATORS 1-11)

A. As part of the base bid replace complete cab front including transom, full swing front returns and car doors with new No. 4 bronze finish. Car stations to be integral and flush with new fronts.

B. Elevators 1-10. Install complete cab interior including walls, ceiling and handrails as detailed on sheet TTF1.01. Replace cab threshold with new. Repair or replace sub floor to accommodate new flooring.

2.11 PERFORMANCE STANDARDS (42” standard Center Opening)

A. Speed: +/- 3% of contract speed under any loading condition.

B. Capacity: Safely lower, stop and hold up to 125% of rated load.

C. Stopping Accuracy: +/- 1/8" - 1/4" under any loading condition.

D. Door Opening Time: 2.4 seconds from start of opening to 1" from fully open.

E. Door Closing Time: 2.8 seconds from start of close until hoistway interlock engages.

F. Run Time: 5.0 seconds measured from brake pick to brake set after a one floor trip to next successive floor.

G. Full Cycle Time: 10.0 seconds measured from when the doors start to close until they are 2/3 open and car level and stopped at next successive floor under any loading condition or travel direction. Full cycle and run times will vary depending on car speed.

PART 3 – EXECUTION

3.01 PREPERATION

A. Inspection:
   1. Verify that hoistway, pit and machine room are ready for work of this Section.
   2. Verify shaft openings are of correct size and within tolerances.
   3. Verify location and size of machine foundation and position of machine foundation bolts.
   4. Confirm electrical power is available and of correct characteristics.
   5. Report deficiencies in writing.

B. Arrange for temporary electrical power to be available for installation work and testing of elevator components.
3.02 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered in the manufacturer’s original, unopened, protective packaging and Contractor shall store material in its original protective packaging.

B. The Contractor shall stage all material shipments to coincide with the project schedule and this material must be stored within the Pittsburgh area prior to removing any elevator from service for the purpose of modernization. Contractor must coordinate deliveries and storage of on-site materials with the Building Manager.

3.03 INSTALLATION

A. Hoistway & Machine Room Construction: Contractor shall confirm existing dimensions of machinery rooms, hoistway, and pit, prior to fabricating and installing elevator work. Examine all parts of the supporting structure and the conditions under which the elevator work is installed. Clean and tighten all rail bolts and fish plates.

B. Occupied Building: Most of the work outlined in this specification will be performed in an occupied building. Proper measures should be observed in order to minimize the noise and obstruction in public corridors. If drilling of structure or other potential excessive noise is required, the Contractor shall notify the Designer and obtain permission prior to the commencement of the work. Materials transported from storage areas shall be done so as not to disturb occupants. For any work being performed in the Elevator Lobbies, proper protection must be installed to protect the existing wall and floor finishes.

C. Overtime Work: All material deliveries and removal of trash, equipment, etc. to and from the building elevator machine rooms must be done between the hours of 9pm - 6am or on the weekends. This overtime/shift work is to be included in this bid and a change order will not be issued for any off hours required to perform this work.

3.04 DESIGNER’S FIELD INSTRUCTIONS

A. During construction, the Designer will give field instructions as required without invalidating the Contract.

B. Such field instruction shall not be construed as authority to change the terms of the contract.

C. In cases where extra cost or project scope change of the Contract are involved, the Contractor shall notify the Designer at the time of such instructions and shall establish cost difference and receive written approval before proceeding.

D. The Contractor shall not be reimbursed for extra work unless the above procedure has been followed.

3.05 SITE CLEAN UP

A. Contractor shall remove from site, and legally dispose of, all rubbish resulting from the work under his Contract.

B. Contractor shall provide a separate dumpster located on site as directed by the Designer.

C. Rubbish shall be removed daily and not allowed to accumulate or overflow the dumpster.

3.06 SAFETY

A. Elevator Contractor to be responsible for the maintenance of all safety barricades at hoistway openings from the point they start their work until such time as the hoistway doors are adequately and safely installed and operational.

3.07 CLEANING

A. Remove protective coverings from finished surfaces.
B. Clean surfaces and components ready for inspection.

3.08 ADJUSTING

A. Operate elevators and make necessary adjustments to ensure elevators operate smoothly and accurately.

B. Adjust for smooth acceleration and deceleration of car to ensure passenger comfort.

C. Adjust doors to open only at the landing where the car is stopping or at rest. Ensure the opening sequence begins only when the car is at rest.

D. Adjust automatic floor leveling feature at each floor to achieve $\frac{3}{4}$ inch from flush.

3.09 PROTECTION

A. Protect finished installation under provisions of Section 015000.

B. Locate and protect or lock moveable equipment and controls so they can only be operated by authorized persons.

3.10 ACCEPTANCE & RELIABILITY

A. Copies of all inspection/ acceptance certificates and operating permits, as required by governing authorities to allow normal, unrestricted use of equipment, shall be provided when the elevator is accepted for beneficial use.

B. Any special tools required to perform diagnostic tests or to reprogram elevator systems shall be provided to the Owner either through lease or purchase. Contractor shall agree to update software during and after installation as more current versions are developed that affect Code and safety requirements.

3.11 WARRANTY

A. Warranty shall include 8 hour call back service, correcting operation faults and restoring/replacing defective/ deteriorated components and finishes, lubricating operational units and supplying expendable materials as required for proper operations. Warranty service shall consist of a minimum of 8 hours per week throughout the one year warranty period starting at Substantial Completion.

1. A service log shall be created and prominently posted per Code requirement. The log shall document a) routine inspection, (b) repairs performed, (c) call backs answered and the nature of the call documented, and (d) corrective action. The Contractor shall assign a technician from his service department to be the responsible warranty person and so notify the Designer. The Contractor should not use construction personnel for the upkeep of equipment during construction, however, may use the construction mechanic in charge for emergency repairs or call backs during regular working hours only. Prorate this commissioning agreement based upon cars taken out of service during the modernization process. Contractor is required to submit the resumes for all mechanics within Davidson County that are qualified to maintain the Vendor's Destination Dispatch system and whom would be available to assume the installation duties for this Building.

3.12 RELATED WORK NOT INCLUDED IN THE WORK OF THIS SECTION

A. As a part of the elevator modernization there will be some building related work items associated with the elevators to meet modernized code requirements. The following survey conditions were noted and will require attention by the general contractor as part of a turnkey installation. These items will be included under the general contractor and have been detailed in other sections of the specification but are summarized below. The Elevator Contractor is expected to include in their bid IUEC labor cost associated with coordination work with other trades. This includes a reasonable amount of operator and cab placement in order to facilitate other trades to perform their work.
B. Elevator Related - Includes but is not limited to (Reference Division 28):

1. Coordinate with Fire Alarm Vendor for testing and connection of contact closures.

2. Elevator lobby, machine rooms, and hoist way / pit smoke detectors, located as required shall be wired from the fire control system to a controller for each group of elevators. A normally closed, potential free (dry) contact rated 120VAC shall be provided for each of the following signals (unless otherwise specified by local code):
   a. Signal to return to the designated landing.
   b. Signal to return to the alternate landing.
   c. Signal to indicate smoke detector in machine room or hoist way / pit active (will require more than one signal per group for split hoist way)
   d. Signal to return to the second alternate landing
   e. Signal to flash the fire hat

3. Provide all necessary electrical work to properly bring modernization up to current ASME and NEC codes. This work includes but is not limited to (Reference Division 26):

   a. Addition of new secondary disconnects to eliminate line of sight issues in machine rooms and create a lockable disconnect. True ground wire will also be required to terminate in each controller.
   b. Addition of cab light and fan 120V disconnect switches
   c. Connection to 3 phase 480 volt power supply and fused disconnects
   d. Shunt trip devices and heat detectors because sprinklers are present. Sprinklers were found in the elevator machine room but not the hoist ways and as a result “shunt trip” breakers will be required.
   e. Replace the emergency power ATS switches and auxiliary dry contacts wired to emergency power supply. Include pre-warning.
      
      1) With the transfer switch we will need at least one dry normally closed contact on the transfer switch to terminate at the elevator controllers to give a range of 10 – 300 seconds advance notice prior to the application of emergency power. Transfer switch shall provide an adjustable time delay of approximately 20 to 45 seconds for pre-transfer signal in either direction. The elevators can be designed to sequentially operate so that only one elevator is running at a time.
   f. Provide separate 110 V- A.C. - 15 Amp rated, single phase power supply with DPST fused disconnect switch and feeder wiring to relay panel for elevator signal system, cab lights and/or rope grippers.
   g. Provide GFI outlets in machine room and pit. Proper lighting in machine room and pits to comply with Code.
   h. Install new LED lights in machine room to meet proper light levels. Provide covers on all light fixtures. Install new 4 foot LED vapor proof lights in elevator pit (4 fixtures) and in secondary access to replace existing.
   i. Elevator pit light switches shall be located adjacent to each elevator pit access ladder approximately 52" above the lowest landing hoistway entrance sill.
   j. Connect existing smoke for zoned arrangement.
   k. Install true ground wire on all main and auxiliary disconnect switches.
   l. Replace pit lights with 4 foot moisture proof LED lights.
   m. Secure the phone line, run in conduit and reconnect.

4. Installation of any additional communication cabling that is necessary to meet the specifications for the EMS systems. Include conduit to engineering if required by code for cat 5 cable.

5. Any cutting and patching for hoistway access switches. Bevel any ledges required to meet local AHJ requirements. Eliminate holes in walls and fire caulk as required. Patch hoistway as needed.

6. Wire and all wire pulls to status panel and master phone stations. Reuse existing conduit for Master Rath phone / status panel.


8. Provide a proper grate on the sump hole to meet inspector’s requirements. If existing is acceptable then retain.

9. There is not any Hoistway ventilation in the shaft which is a requirement of current building codes. This has been reviewed by the Authorities Having Jurisdiction and will be acceptable through a variance granted.

10. Emergency power change over and testing will need to occur over a weekend. See electrical Contractor for requirements and IUEC support level required to cover any standby overtime.

11. Painting of door frames
12. Air conditioning and ventilation of machine room space. Provide room environment to ensure reliable operation of micro-processor equipment with temperature range 60-80 degrees F. with 80% non-condensing humidity. Use existing HVAC source and install new exchanger or install new split system HVAC to maintain a temperature range of 60-80 degrees F. HVAC shall may be located within the bounds of the machine room. Preliminary estimates are 14,000 BTU per elevator.

13. Install fire extinguisher
14. Provide dedicated phone line at machine room
15. Equipment room doors must be metal Class B rated doors with closer mechanisms. Doors must be self-closing and self-locking.
16. Water drain line over the controls shall be provided with a drain pan or drain pans if not already present.
17. Replacement of existing flooring with new specified flooring.

3.13 MISCELLANEOUS WORK INCLUDED IN THE WORK OF THIS SECTION

A. Custom Temporary enclosures or other protection from open hoistways (corridor barricades).
B. Connect smoke devices to elevator controllers and testing (on overtime).
C. Installation of new security system and cross connection to new controller
D. Test emergency power during overtime hours.
E. Paint all machine room floors and existing machines after installation.
F. Install car top railings on all passenger elevators upon award of contract on all elevators.
G. Paint all pit floors and car tops.
H. Install pit ladders or modify existing ladders to comply with current requirements.
I. Install approved hoistway screening.
J. Furnish and Install cab phones and master intercom station.

END OF SECTION
SECTION 142120
ELEVATOR MODIFICATIONS – ANDREW JACKSON

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish and install all materials, programming and labor necessary for the elevator modernization herein specified.

B. It is the intention of the Contract Documents to call for finished work, completely tested and ready for the Owner’s operation.

1.02 RELATED DOCUMENTS

A. Section 089100: Louvers to vent shaft. Elevator Contractor will include labor cost to operate the elevator for contractor work associated with this section.

B. Section 092116: Cavity shaft walls.

C. Section 096500: Resilient flooring in cabs with installation specified herein.

D. Section 099000: Finish painting of hoistway doors and frames.

E. Section 260519: Electrical power supplies.

1.03 SUBMITTALS

A. Submit items under provisions of Section 013000.

B. Shop Drawings and Product Data
   1. Product Data: Submit manufacturer’s technical product data and installation instructions for each principal component or product, and include certified test reports on required testing. List and describe features of control system, performances and operating characteristics.
   2. Shop drawings: Illustrating general arrangement and loads of elevator equipment, plans and other details shall be provided. Shop drawing approval must be obtained before proceeding with the fabrication and installation of components. Upon completion of the work, deliver to the Designer, two complete “as installed/ built” sets of wiring diagrams covering the products installed. The above documentation shall become the sole property of the Owner.
   3. Samples: Submit fixture samples; cover plates, buttons and hall lantern lens samples (as required by the specification).
   4. Maintenance Manuals: Three (3) bound manuals shall be provided for each group of elevators (high and low rise) to be provided in their respective machine room, with operating and maintenance instructions, parts listing, recommended parts inventory listing, purchase source listing for major and critical components, emergency instructions, and similar information.
   5. Diagnostic Tools and Proprietary Information: The Elevator Contractor shall make available to the Owner the option to lease or purchase any diagnostic “hand held” devices that apply to the elevator systems installed herein. Software upgrades shall be offered to the Owner on an annual basis as a condition of lease/ or purchase. Bidders are requested to identify specifically any information contained in their bids which they consider confidential and/ or proprietary and which they believe to be exempt from disclosure citing specifically the applicable exempting law.
   6. The Designer checking and review of Contractor’s and sub-contractor’s drawings or equipment details does not relieve the Contractor from responsibility for errors, omissions, or equipment characteristics furnished in accordance with such checked or reviewed drawings.
7. The checking of Contractor’s and sub-contractor’s drawings or equipment details by the Designer does not give or transfer any responsibility to the Designer for errors or omissions. Where such errors or omissions are discovered later, they shall be made good by the Contractor irrespective of any review by the Designer.

C. Submit product data on the following items:
   1. Signal and operating fixtures, operating panels and indicators.
   2. Cab design and components.
   3. Electronic equipment to control and monitor elevator control functions.
   4. Two-way communications equipment and signage, data plates and other identification devices required by ANSI A17.1.

D. Submit two 4 x 4 inch minimum size samples of materials and finishes required for cab interior, cab ceiling, cab doors, operating and signal system fixtures and finish of hoistway doors and frames. Provide finish samples to be actual finishes on base material to which it is to be installed.

1.04 QUALITY ASSURANCE

A. Manufacture and Install per Industry Standards:
   2. Comply with applicable code sections related to the latest adopted edition for the State of Tennessee.
   3. Comply with applicable NFPA Codes and specifically with the section relating to electrical work and elevators.
   4. Comply with Title III of the American with Disability Act. Design the elevators to comply with requirements for the handicapped, including clearances, handrails, locations of signal equipment, and similar provisions.
   5. Comply with applicable sections of the National Electric Code relating to electrical work and elevators.
   6. Comply with applicable sections of the current Building Codes for the state of Tennessee.
   7. Meet requirements and provide labels (UL and NEC) for electrical equipment and materials wherever standards have been established and label services are regularly furnished by.

B. Manufacturer: Company specializing in manufacturing elevator equipment with 15 years of documented experience.

C. Installer: Employees and supervisor on payroll of the elevator manufacturer or a licensed franchisee of the elevator manufacturer.

D. Comply with ANSI A17.1 and ANSI C2 and as supplemented in this Section.

E. Door and frame assemblies: Comply with NFPA 80 and UL 10B.

F. Welding: Comply with AWS D1.1.

1.05 SUBSTITUTIONS

A. Product Substitution - Certain manufactured articles specified herein are mentioned under one or more trade or manufacturer’s names. These manufactured articles, as specified, shall form the basis of the contractor’s bid. Additional products will be permitted by addendum only.

1. Articles of other manufacturers, of equivalent design, quality and capacity, as adjudged by the Architect and the Designer’s Consultant, will be considered no later than ten (10) working days prior to bid date. Establishing proof of the equality of the product to that specified shall be the responsibility of the bidder. Determination of equality of all products is vested in the Designer, whose decision shall be final and binding upon all concerned. No substitutions will be allowed after the Contract is awarded.

2. Where a Contractor proposes to use an item of equipment other than that specified or detailed in the specification that requires any re-design of any other part of the mechanical, electrical or architectural layout, all such re-design and all new drawings required therefore shall be prepared by the Contractor, at his own expense. And, should this re-design require additional cost to other Contractors, this expense shall be borne by the contractor making such changes. All changes shall be approved by the Owner.
1.06 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 017821.

B. Include description of the elevator system’s method of operation and control including group supervisory control system, motor control system, door operation, signals, special service provisions, emergency power operation, and special or non-standard features provided.

C. Provide parts catalog with a complete list of equipment replacement parts, with equipment description and identifying numbers.

D. Provide a legible schematic of wiring diagrams covering electrical equipment installed, including changes made in the accepted work of this Section, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.

E. Provide one copy each of the following items behind plastic or glass glazing, in a metal frames, mounted adjacent to each other on a machine room wall in a location which is readily accessible for reference.
   1. Master electrical schematic.
   2. Lubrication chart.

1.07 MAINTENANCE MATERIALS

A. Provide one set of the programming tools and testing equipment required for reprogramming and testing of the elevator controller.

1.08 PREINSTALLATION CONFERENCE

A. Convene a pre-installation conference at least one week prior to commencing work of this Section.

B. Require attendance of persons directly involved with the work of this Section.

C. Review schedule of installation, installation procedures and conditions, and coordination with related work.

1.09 WARRANTY

A. Provide a one year manufacturer’s warranty under provisions of Section 017821, commencing at the date of Final Completion of the Project.

B. Include coverage of the elevator system controller and operating equipment and devices.

1.11 TESTS

A. Provide inspection and testing of elevator system.

B. Obtain and pay for municipal and state permits and inspections required.

C. Conduct tests required by governmental agencies.

D. Schedule tests so that the authority having jurisdiction, the Designer, the Owner and the Contractor are all present during tests.
1.12 DELIVERY, STORAGE AND HANDLING

A. Deliver items to the site and handle, store and protect under provisions of Section 016000.
   1. Do not deliver materials until the areas in which they are to be installed are ready to receive them.
   2. Fully protect movable and operating equipment from the weather.
   3. Ensure that factory finishes are wrapped and crated to protect from damage.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Otis Elevator – 411 / Compass

B. Schindler Elevator Corp. – TXRG / Schindler ID

C. KONE Elevator – Resolve / Polaris

D. Thyssen Krupp - TAC50

2.02 EQUIPMENT SUMMARY TO BE UPGRADED

A. Andrew Jackson Building -Nashville, Tennessee

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<tr>
<th>Type</th>
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<th>Service Elevator</th>
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<td>8</td>
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<td>B, G 1-16 (18)</td>
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<td>2SCO 4’-0” X 8’0”</td>
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<tr>
<td>Type Door Operator</td>
<td>MOVFR - GAL</td>
<td>MOVFR - GAL</td>
</tr>
</tbody>
</table>

2.03 COMMON TRACTION ELEVATOR ELEMENTS

A. Gearless Traction Machine (Elevators 1-7): Clean, test and re-insulate armatures (blow out, vacuum, brush, etc.), spray with red insulating paint (Glyptal), turn and undercut (machine) commutators and polish to true up surface, clean and test brush holders and rigging assembly, replace brush holder studs and insulators. Elevator Contractor is responsible for all other “refurbishing” of the gearless machines including but not limited to; replace brushes, replace all machine bearings as needed and flush and re-fill oil supplies, scrape and paint machine, thoroughly clean out behind and under machines, etc. All fastenings shall be examined and made secure. If control change requires additional current on motor windings, a blower shall be installed on the hoist machine in such a way to pass air over the field windings. This would be done to lower machine operating temperatures in order to improve performance. Design solid- state units to limit current, suppress noise, and prevent transient voltage feedback into building power supply. Isolate unit to minimize noise and vibration transmission. Provide isolation transformers, filter networks, and choke inductors.
   1. As required, defective solder connections between a commutator segment and motor armature winding shall be renewed. Mica insulation between commutator segments shall be undercut and the commutator resurfaced to provide a smooth concentric brush contact surface. A field coil with outer wrapping that is split or unraveling shall be removed from the hoist machine and rewrapped with an approved insulating material.
   2. Note: The elevator machines are to be evaluated by an independent motor shop. Include the cost of this evaluation and standby time to perform said evaluation in scope of this Section. The refurbishment
recommendations made by this evaluation are to be included in this scope and all cost associated with these repairs to meet the requirements above are to be the responsibility of the elevator contractor. Include refurbishment cost in Unit Price on the Bid Form (See also Section 012219).

3. Provide new hoist cables on elevators showing 50% or more of the allowable diameter loss allowed by code. Check sheaves and undercut as needed to minimize wear on new cables.

4. All Units - New rope guards shall be provided to prevent the ropes from leaving the sheave under any condition, with clearance between the guard and sheave to be less than the rope diameter. Install “ascending car over-speed and unintended car movement” devices per Code requirements found in A17.1-2010 or current edition. If current rope guards meet this requirement they may be retained.

B. Geared Traction Machine (Elevator 8): Retain/ reuse existing geared traction machine gear boxes and deflector sheave assemblies, and electromechanical brakes, in place, and “refurbished”. Refurbishing consists of: seal replacement, thrust bearings and sheave bearings (replace bearings if necessary), flush/ refill oil supplies, replace brake contacts and brake shoe pads. Provide new hoist cables on elevators showing 50% or more of the allowable diameter loss allowed by code. Check sheaves and undercut as needed to minimize wear on new cables.

C. Brake: Check and replace brake pins and bushings as required. Rewind brake coils and re-line brake shoes on all elevators as needed. Replace all springs, actuators and contacts, scrape and paint all of the brake assembly (do not paint pins) to match the machine. The elevator shall stop electrically before the brake shoes apply. A system where slow down and normal stopping is achieved by using the brake, will be rejected. A system of controlled emergency stopping with delayed brake application will be rejected. Assure that brake capacity will hold the car at any landing with 125 percent of contract load and with normal counterbalancing.

D. DC (Regenerative) Drives: Provide within new controller cabinets, new Magnetek DC drives. The drives shall be designed to convert alternating current to direct current and function to vary the D.C. current to the D.C. hoist motor providing smooth acceleration and deceleration regardless of elevator load. Power generated during overhauling load conditions shall be returned to the building power line. Connect resistance in parallel with the motor armature, to absorb regenerated power, when normal drive power is removed from the motor. Drives shall be designed to be fully isolated from car controller signals and equipped with a “fast acting” fuse to protect against current surges.

1. Chokes and transformers, where possible, should be physically located adjacent to the D.C. machine motor (show layout for Designer approval prior to fabrication). Acceptable drives systems shall be functional under varying voltage factors of +/− 10 %. Drive control systems shall be closed-loop feedback type based primarily on car position. The velocity profile should be calculated by the individual car computer therefore producing a smooth ride and accurate stopping. A machine mounted velocity transducer, spring loaded shall be used to provide continuous comparison machine speed to velocity profile and to car speed. The position and velocity feedback should permit fast and accurate control of acceleration and retardation not to exceed 5 feet/second/second with an initial ramp up between 0.5 and 0.75 seconds regardless of direction of travel or load in the car. Any over travel or under travel or rope stretch shall be electrically compensated.

E. Micro-Processor Control System: Retain existing Kone Resolve Controls system and provide Dispatch overlay to meet the requirements to add Destination Dispatch. If manufactures control system does not allow for overlay with current system then provide new micro-processor control systems as defined under “operation” for all elevators covered under this specification section.

F. Operation: Retain existing control and replace drive as described. At Manufactures choice provide new microprocessor based supervisory and car control system capable of efficient system dispatching. The system shall be capable of determining various traffic conditions and assign corridor calls based upon; number of car calls assigned to each elevator, position and condition of each elevator (location in hoistway), direction of travel, accelerating and decelerating, full speed, elevator in by-pass, and elevator at Lobby with next signal. With minimal building traffic, elevators shall be programmed to zone with at least one elevator at the Lobby floor. The system shall be capable of providing priority service to the Lobby during periods of heavy and light traffic demand. Individual elevators shall utilize group dispatching technology capable of providing the best possible service to the Building. It is the intent of
the Owner to have security enabled elevator controls either via lobby card readers or in each car. Contractor is to include in their bid provisions for a card access security feature established after contract award.

1. Units 1-8 - The Elevator Contractor shall provide an Up Peak Destination Based Elevator dispatching system integrated within the per car control and drive/velocity panel, or separated and housed within an individual control cabinet as may be the standard of the manufacturer. See details below. (Units 1-8) – In lieu of providing full destination dispatch, furnish and install an ‘Up Peak Only’ control overlay for destination dispatch from the main lobby, Level 1 and Basement levels. The car station buttons will remain inoperative when the elevator is at the main lobby/ basement and car calls will be initiated from the main lobby kiosk. Upper floors will operate off of existing up and down hall station fixtures as conventional dispatch.

G. Operation- Group Control (Retain existing or Replace to meet DD Requirements):

1. When the cars are at rest, they shall be assigned throughout the building to predetermined zones. The first car entering a zone shall become assigned to that zone. The car may run through an occupied, assigned zone in search of an unoccupied zone in which to park. While there are no calls registered, the cars shall remain in a parked condition with the doors closed. The lowest zone shall consist of the Lobby and the first upper floor serviced. The remaining floors shall be divided into equal zones with one car randomly assigned to each zone.

2. Optimized system response should be achieved by means of calculating relative system response and/or aided by artificial intelligence factors. The computation of each elevators response to a call shall be based on, but not limited to, such relevant factors as distance, service to previously assigned car and hall calls, car load, direction, door and car motion status, and coincidence of car or hall calls.

3. A car without registered car calls arriving at a floor where both up and down hall calls are registered shall initially respond to the hall call in the direction that the car was traveling. If no car call or hall call is registered for further travel in that direction, the car shall close its doors and immediately reopen them in response to the hall call in the opposite direction. Hall lanterns shall indicate the changed direction when the doors reopen. Coincidence calls where a car call and hall call coincide, preference shall be given to assigning the hall call to the car that must already stop at the floor to serve its car call. A twenty (20) second parameter shall be designed into the system whereby an elevator with a car call will receive priority to answer a corresponding corridor call if it can do so within twenty (20) seconds. If it cannot answer the call within the prescribed time, the first available car shall be assigned. A continuous reassessment of calls shall be made, with the processor having a capability of reassessing, a minimum, thirty- two (32) times per second.

4. The system core memory shall be non volatile (EPROM) capable of storing the following group adjustments:
   a. number of cars required at the Lobby,
   b. number of cars required in the high zone,
   c. up peak traffic detection parameters,
   d. minimum peak duration,
   e. down peak traffic detection parameters,
   f. minimum down peak duration,
   g. traffic demand parameters to release the next car,
   h. selectable hall waiting time,
   i. coincident calls maximum waiting time,
   j. the stopping table for all cars with the direction of the stops,
   k. security information, and
   l. high priority floors.

H. Destination Dispatch Up Peak Only (1-8 only)

1. With submission of this bid include pricing to provide destination Up Peak dispatch control from the Basement, Main Lobby Level and Level 1. This submission should include detailed drawings of LCD/touch screens, along with locations and quantities of such, numbering/lettering of units, and all pertinent information for Designer to make a sound decision on. Each contractor is to provide information concerning access control capabilities associated with their system and how it pertains specifically to this application. Include a traffic study comparison of base bid specified system vs. the destination dispatch system to indicate the number of elevators that could be eliminated from the system and still obtain similar handling capacity, wait times and travel times as the seven car base bid operation.

2. The destination based dispatching system shall receive complete data on passenger destination and traffic volumes and always select the best elevator to serve, considering both the boarding and exiting stop (destination), as well as consequential delays suffered by other passengers, both those already in the elevator
and those who have yet to board. It shall minimize the number of stops required to handle a given volume of traffic, thus reducing overall passenger travel times and energy consumption. In making this determination the momentary location of the traveling passenger shall be considered by virtue of floor location and the walking distance to the cars from individual input terminals such that no allocation shall be made that would cause the elevator doors to close before the intending passenger could directly approach the elevator.

3. By directing passengers to board specific elevators the system shall permit increases in handling capacity without need for temporary or permanent zoning indicators. During very heavy UP-peak, maximum coincident stopping shall be automatically achieved. Any available capacity of the system is to be applied toward waiting time reduction. Under all traffic conditions, reduced passenger destination times (the sum of waiting + loading + travel times) shall be significant.

4. Passengers will enter their desired destination floor using input terminals provided at each boarding floor. The system shall acknowledge the destination floor by immediately displaying the requested floor number on an integral display screen. After the destination is displayed, the letter designation of the car assigned to the passenger shall be flashed on the display together with the directional symbol indicating the location of the specific elevator. By directing passengers to board specific cars, handling capacity will increase without the need for temporary or permanent zoning indicators.

5. Touchscreen fixtures are the primary passenger input terminal devices for B, L and *1 levels required for normal elevator operation. The use of traditional up/down corridor call buttons, hall lanterns and in car floor buttons are not needed for normal passenger use and shall not be provided.

6. The destination dispatching system shall have no impact on the normal operation of the base elevator system, namely it shall assure normal operation of Fire Service and other life safety features. All floors shall be designated by numerals and each elevator shall be assigned an alphabetic character.

I. Hoist Cables: All hoist cables are to be re-used, however they must be equally tensioned. Replace hoist cables on Elevators if diameter loss is 50% or more then allowable diameter loss or there is sign of rouge. Verify all cable hitches are weld type shackles. Load weighing shall be installed either under cab or at the terminus point for the hoist cables on the car top crosshead. Install “ascending car over-speed and unintended car movement” devices per Code requirements found in A17.1- current edition. “Re-groove” traction drive sheave as needed to maintain any new hoist ropes.

J. Counterweight: Elevator shall be suitably counterbalanced for smooth and economical operation. Retain (clean and paint) existing counterweight frame and sub-weights. During balancing secure all sub-weights and isolate them to eliminate any detectable movement. The counterweight shall be equal to the complete elevator car and approximately 40 percent of the specified load. Replace rollers on existing guides, refurbish counterweight roller guides by replacing all bushings and rollers as needed. Install roller guide covers on top guide

K. Compensation: Replace any compensation ropes or Wisperflex that show heavy wear or breaks. Replace any compensation that is cracked or damaged so that it is maintainable. Replace any damaged compensation sheaves and/or replace bearings in sheaves as needed. All compensation chains shall be replaced with wisperflex and new roller dampening installed.

L. Governor, Governor Cable & Tail Sheave: Retain the existing governor and governor cable. Retain existing pit mounted governor tail sheaves and replace bearing if needed. As the car reaches a preset speed in the down direction, the governor will trip, applying the safety, and bringing the car to a smooth and gradual stop. Label each governor with appropriate elevator number as well as identifying up and down direction and which governor is for the car or counterweight.

M. Safety Device: Reuse existing car safeties. Clean, lubricate and adjust. Perform rated load test upon completion of the modernization.

N. Wiring: Retain existing machine room and hoistway wiring. All wiring and electrical interconnections shall comply with the governing Codes. Insulated wiring shall have flame retardant and moisture proof outer covering, and shall be suspended to relieve strain on individual conductors. Traveling cables shall be of the round type and capable of handling a minimum of 10 percent spare conductors and contain 4 pairs of shielded wire.
O. Terminal Stops & Limits: Retain existing automatic stopping devices and final limit switches that are operated by the car and arranged to stop the car and prevent normal operation should it travel beyond the zone of the normal stopping device.

P. Automatic Self-Leveling: The elevator shall be provided with a two-way, self-leveling feature that will automatically bring the car to the floor landings. This self-leveling shall, within its zone, be entirely automatic and independent of the operating device and shall correct for over-travel or under-travel within 1/4” of floor levels. The car shall also be maintained level with the landing irrespective of the load.

Q. Pit Switch: An emergency stop switch shall be located in the pit accessible from the pit door(s) and at code required height. Light switch is to be relocated to 48” above finish floor.

R. Buffers: Retain existing buffers. Clean, flush and re-seal if necessary. Buffers shall comply with ANSI A-17.1 Code requirements.

S. Car Top Inspection Station: Retain existing car top inspection station with an “emergency stop” switch and with constant pressure “up-down” direction buttons. The device shall make the normal operating devices inoperative and give the inspector complete control of the elevator.

T. Leveling Control (Retain existing):
   1. Leveling devices shall be provided with a position selector integrated with the new micro-processor system. Car position in the hoistway shall be digitized through means of a fixed vane. The position transducer shall permit a 0.25 inch resolution accuracy for the entire length of the hoistway. Floor position and slowdown limit position shall be stored in non- volatile memory (EPROM). The position selector shall also be used to determine the car velocity to within +/- 1%.
   2. An automatic two-way leveling device shall be provided which will govern the leveling of the car to within 1/8”-1/4” above or below the landing sill. Any over travel or under- travel or rope stretch shall be electrically compensated.

U. Operation Under Group Dispatch Failure (Retain existing): If the group controller goes off-line during normal power, the cars shall emergency dispatch in their assigned zones (determined at initialization of system). Cars not assigned during initialization will respond only to car calls. If the group controller goes off-line while on an emergency power source, the car manually selected to run on emergency power will begin to emergency dispatch at the floors assigned to it during initialization.

V. Independent Service (Retain): A switch shall be provided in the car operating station, when actuated, shall disconnect the elevator from hall buttons and permit operation from the car buttons only. If the car is on independent service mode when elevator is recalled by means of SES, a buzzer shall sound in the elevator and a jewel shall be illuminated as required by ANSI.

W. Emergency Fire Fighting Operation (If Control is Replaced):
   1. Provide an emergency operation system for use by fire fighting or rescue personnel as specified by ANSI A17.1-2010 edition. Switches shall be clearly identified as to function and shall be arranged and designed to prevent unauthorized use or accidental operation being placed behind locked cabinet within the car operating panel as described in ANSI A17.1-2010.
   2. Provide keyed switches in panel at the Ground floor in accordance with ANSI A17.1-2010 edition. Provide SES (Safety Emergency Phase I & II).

X. Special Emergency Service Phase I: Emergency operation to return the elevator to the Ground floor level by means of a key operated switch at the Ground Floor shall be provided in compliance with Code. The key switch shall be mounted integral with new corridor call cover plates- see fixture & signal section.

Y. Special Emergency Service Phase II: Within elevator controls of each elevator during the emergency operation, a key switch shall be provided to allow independent use of the elevator by emergency or rescue personnel. Operation as specified by ANSI A-17.1, 2010 edition, shall apply to its operation. Auxiliary contacts in the elevator control panel shall be available for interfacing with the building alarm system.
Z. Elevator capture smoke/heat devices, and their required power supply: to be zoned as follows; Ground Floor, typical elevator landing corridors, and machine room.

AA. Ascending car over-speed and unintended car movement protection (if Control is replaced) Protection shall be provided with a device to prevent the car from striking the hoistway overhead structure and to prevent unintended car movement away from the landing with the hoistway door not in the locked position. These safety requirements shall operate and function in accordance with the ANSI A17.1 Code. Rope Gripper device is to be mounted in the machine room or at the top of the hoistway as determined by the successful contractor. Any and all steel, structural reinforcement, anchors or fasteners required to mount this device in the contractor’s preferred location shall be by this contractor.

BB. Rails and Brackets: Retain existing. Report any variation in rail alignment in order to determine remedial correction.

CC. Roller Type Guide Shoes: Re-condition car and counterweight guide shoes and replace all rollers and bushings. Install guide shoe covers. New Guide shoes can be provided in lieu of reconditioning.

DD. Pit Equipment & Car Top Enclosure: Existing pit channels, main car buffer and rails to be painted up to 4’ above the pit floor. Paint pit floor and walls up to 4’ high. Provide a metal car top safety railing on both sides and the rear of the cab, furnish and install an electrical interlock on existing top exit panel (enlarge top exit panel opening if required to meet current code). Scrape and paint existing cab platform, stiles, framing, car top and exterior metal cab shell.

EE. Card Reader devices and control provisions- Not Required

FF. Interim Traffic Manager (Required with Control Replacement) – During the modernization process and after the first elevator is completed and returned to bank operation provide an interim traffic dispatch system that will coordinate dispatching of the elevators between the new and old system. The ITM will stay in place until the last elevator is removed for modernization.

GG. Master Phone Station – Provide a master Rath phone/intercom station adjacent to the status panel or incorporated in the panel at the fire command room. Reuse current conduit for all wire.

2.04 ADDITIONAL CONTROL PROVISIONS

A. Nudging Action: If door opening is obstructed for a predetermined adjustable time (20-30 seconds), a buzzer shall sound and attempt to close doors with a maximum of 2½ foot pounds kinetic energy. Allow door to close after obstruction is removed.

B. Differential Door Time: Provide separately adjustable timers to enable varying time that the doors remain open after stopping in response to calls. In response to a car call- adjustable between 1 to 8 seconds; landing call-adjustable between 3-8 seconds. Use landing call timing when responding to coincidental calls.

C. Hoistway Access Switches: An enabling key switch shall be provided in the car operating panel to render all car and hall buttons inoperative and to permit operation of the elevator by means of an access key switch adjacent to the hoistway entrance at the access landing. The movement of the car away from the access landing, other than the lower terminal, by means of the access key switch at the landing shall be limited in travel and direction to that as specified for the upper landing in the latest revision of the ANSI/ASME A-17.1 Code. Contractor to include all cutting and patching for this new fixture. This is not included in related work by others.

D. Out of Group Operation: In the event that a car does not start for a hall call dispatch signal, the car will be removed from group operation after 20 seconds.

E. Load Weighing: Load weighing switches/cells shall be provided which will function to bypass hall calls when their respective load weighing inputs are energized. Bypass should be established at a setting of 70% of rated load

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capacity. Load weighing may be used for sensing traffic conditions and used as a parameter to determine dispatching strategy, establish a setting of 50% of rated load capacity for this feature.

F. Inconspicuous Riser: Provide an IR feature for elevator 8 so that the single push button riser located at the rear opening can be run independently from this push button riser. The system will need to have the capability to be turned on and off by a time clock and overridden via key switch located at the 1st floor or through the EMS system.

G. Elevator Management System (EMS): Supply a hardware and software monitoring system conforming to the following requirements. Provide an integrated display system as manufactured by the approved elevator contractor. Provide a minimum Pentium IV Intel Computer (with Microsoft program), and 17” VGA flat panel color monitor and printer. Elevator position, door position, elevator status, group status, car calls and hall calls shall be displayed. Provide visual and audible signal in the event an elevator is removed from service. Provide means to remove elevators from service, inhibit hall and car calls on an individual basis. The system processor shall be capable of providing log of events which affect the operation of the elevators, including events indicating elevators are not removed from service. Provide record of hall call durations. Records shall be stored in 15-minute increments with a minimum of 30 days of data stored in one file. Provide a means to print summary of events and monitoring data. Provide one unit at the security desk and one unit at engineering.

2.05 SIGNAL EQUIPMENT

A. Retain existing car control stations (main and auxiliary) and, car position indicator in each car. Hall push-button stations on each landing - two separate push button risers are to be replaced). Provide illuminated buttons and signals, which light-up when activated and remain lit until the call or other function has been fulfilled; fabricate of acrylic or other permanent translucent plastic. Except for buttons and illuminated signal elements, fabricate buttons with matching metal finish. Except for buttons and illuminated signal elements, fabricate signal equipment with exposed surfaces of stainless steel with manufacturer’s standard directional polish or satin finish. All new buttons to be LED illuminated with halo design.

B. Car Control Stations: Retain existing car control stations containing call buttons for each landing served, and containing other buttons, switches and controls required for specified car operation and control. Relamp each button with new LED lamp. Provide operating device symbols as required by Code. Mark other buttons and switches with identification for required use or function. COP’s should come with engraving identifying the Elevator Number at the top. Because elevator 8 is getting a new cab the car control station will be replaced on this elevator with a new vandal proof car operating panel with new stainless steel metal LED buttons.

C. Corridor Call Stations: (Up Peak only) Retain existing typical hall station so that each terminal landing a single push button and at each intermediate landing, a button fixture shall be provided containing “UP” and “DOWN” push buttons. Match current number of risers. Any new fixture shall be designed to cover the existing wall openings and installed flush with the finished wall line (elongated type fixture must be provided to cover existing openings and lower call stations to meet ADA requirements). Buttons shall match design and finish of car stations. At Basement and Main lobby new touchscreens shall be provided- three in each lobby and two outside the entry location for a total of five per floor (B, Lobby and 1).

D. Hall Lanterns: (Typical floors) Retain existing hall direction lantern, re-lamp with new LED lamp and install electronic tone device, which, when the car stops and the doors are opening, shall indicate the direction in which the car is traveling. A double stoke electronic chime shall also be furnished which will sound once for the “UP” direction and twice for the “DOWN” direction as the doors are opening.

E. Lobby PI and Combo Hall Lantern: Replace corridor position indicators and lantern (At B, L and *1) with new LED 2.5” Digital PI/Lantern fixture to cover existing. Flush Application. Lanterns will be replaced with Active Designation plates showing Letter Identification for each elevator- One on each side of Digital PI.
F. Each floor input terminal shall include the decade input buttons, a display and voice output for handicap usage and ADA compliance.

1. As required under CABO /A117.1, a large button, equivalent to the width of 3 input buttons is located under the floor input buttons to activate features designed to aid people with visual disabilities.

2. Only legitimate destinations shall be indicated and transmitted from the keypad to the control system via the serial data link. Invalid calls or commands that are not possible at the time of entry shall prompt a “?” or “***” symbol indication on the display screen, without transmission to the control system.

G. Entrance Enunciators/Designation Plates- Car identifying plaques, “Hall Enunciators” (A to H) shall be provided permanently above the elevator doors in a custom fixture as shown on the drawings. Each plate must be custom and approved by Owner. In normal service of the enunciators is active (illumination only), but under handicap operation they shall generate specific audible (tone and voice) confirmation of the elevator assigned the call.

H. Handicap Operation- In addition to the numeric buttons, each floor terminal is to be supplied with a button designated with the International Handicap Access wheelchair symbol. This button is to be the initiating button for handicapped passenger procedures. If the "wheelchair" button is pressed, this will initiate a special journey mode.

1. The destination is registered in the conventional manner.

2. Car allocation is confirmed both visually and by a 2nd tone that is repeated at the entrance enunciator of the elevator assigned that call. The floor enunciator is illuminated and flashes to coincide with the audible signal at the input terminal confirming to partially sighted and blind persons which car has been assigned. The assignment is announced at the terminal e.g. “take car A” and car A announces its location.

3. The allocated car will be selected according to:
   a. Space inside the elevator to permit a wheelchair user to board, nominally 4 persons but variable.
   b. ETA of the elevator must be later than the ETA of the passenger at the boarding entrance, assuming an extended 2-3 seconds per yard passenger approach time.
   c. Preference for no exiting passenger for the boarding floor.

4. Upon arriving at the ingress floor and after opening the doors the elevator shall announce the open status of the doors and automatically extend the dwell (non-interference) time by 5 seconds (variable) to permit comfortable access. System shall send a signal to the door operator and will initiate a slow closing of the doors.

5. Upon arrival at the egress floor the system shall announce the floor number followed by confirmation of door open status.

6. After the extended door dwell time, the car shall return to normal service.

I. Ground Floor Fire Command Panel: Retain Existing fire command and emergency power selection panel in the fire command room, modify as needed to comply with local code requirements. Any new panel shall cover existing and be flush or boxed in for a finished appearance. Panel shall include PI and required switches as well as master phone station to allow emergency personnel to communicate to each elevator. Provide a new master phone station adjacent to the status panel to access all elevators via the Rath or equal phone/intercom.

J. Emergency Signal Bell: A new car emergency signal bell shall be provided of the “monitor type” suitable for outlet box mounting. The bell shall be arranged to sound when the emergency button in the car is pressed. The bell shall be mounted in the hoistway at the lowest landing.


L. Emergency Car Lighting: An emergency power unit employing 1 12-volt sealed rechargeable battery and totally static circuits shall be provided that shall illuminate the elevator car and provide current to the alarm bell in the event of normal power failure. The equipment shall comply with the requirements of the ANSI/ASME Code.

M. Cab fan: Retain existing or replace if not operating.
2.06 SPECIAL DESIGN CRITERIA

A. Design for the handicapped:
   2. Locate uppermost button in the cab control panel and the centerline of the telephone handset to be not more than 54 inches above the cab floor.
   3. Sound audible soft-tone signal in car when car is stopping or stopped at a floor.
   4. Provide hall gongs which sound once for up stops and twice for down stops.
   5. In each cab, provide 7/8 inch high Arabic numerals raised .03 inches from the surface and Braille numerals immediately to the left of floor buttons to identify floor.
   6. At each floor landing, provide 2 inch high Arabic numerals raised .03 inches from the surface and Braille numerals on each door jamb if not existing.

2.07 MATERIALS

A. Rolled steel sections, shapes and rods: ASTM A36.

B. Sheet steel: ASTM A446, Grade B, zinc coated to ASTM A526 G90 coating designation.

C. Stainless steel: ASTM A167, Type 304, No. 4 finish.

D. Aluminum: Anodizing quality, alloy as follows:
   1. Extruded material: ASTM B221 6063.
   2. Sheet material: ASTM B209 5005.

E. Plywood: APA rated sheathing, 32/16 span rating, Exposure 1, sanded, fire retardant treated.

F. Particleboard: CS 236 high density type, composed of wood chips and waterproof resin binders, of grade to suit the application, with sanded faces.

G. Wall Protection: Refer to sheet AJ F1.01.

H. Primers:
   2. Plain steel surfaces: Zinc chromate alkyd type.

I. Paint: Semi-gloss alkyd enamel of colors selected.

2.08 CAR DOOR OPERATION AND CONTROLS

A. Door Operator: Retain existing GAL direct current "closed-loop", motor-driven, heavy duty operator, designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel, and the door operating mechanism shall be arranged for manual operation in event of power failure. The leading edge of each leaf of the car door shall be provided with a retractable reversal edge arranged to automatically return car and hoistway doors to the open position in the event the doors are obstructed during closing cycle. Doors will then resume closing cycle. Doors shall automatically open as the car arrives at the landing, and shall automatically close after an adjustable time interval or when the car is dispatched to another landing. Direct drive geared operators, A.C. controlled units with oil checks, or other deviations from the above are not acceptable.

B. Interlocks: Retain existing hoistway door interlocks. All locks are to be checked and cleaned and rebuilt as needed. Furnish and install new clutches and vanes, springs and keepers. Properly adjust for smooth and trouble free operation. Replace all closers as necessary and replace car gate switches with new. Install new relating cables as needed.
C. Car Door Hangers and Tracks: Provide new car doors and new hangers. Retain car door tracks. Clean surfaces and tighten bolts and related hardware that are re-used. Provide new polyurethane rollers with ball bearings properly sealed to retain grease. This scope includes replacement of all car doors.

D. Door Zone Restriction Devices: Provide door open restriction devices on all doors per ANSI/ASME A17.1 Code. Doors will be mechanically restricted from opening unless the elevator car is in the designated unlocking zone. Hatch latch restrictors are not acceptable.

E. Static Type Door Edges: Retain existing electronic door edge. At manufactures option provide new non-retractable proximity type door edges that, upon sensing an obstruction in the entrance within a range of 5 inches causes doors to stop and reopen. Door detector devices as manufactured by Janus “Pana 40 3D” and/ or approved equal. Door close shall be arranged to start within a time consistent with ADA requirements from notification that a car is answering a hall call. Doors shall be arranged to remain open for a time period sufficient to meet ADA requirements.

2.09 HOISTWAY ENTRANCES

A. Hoistway Door Panels & Frames: Re-use existing in place. All doors to have hoistway escutcheon access keyway.

B. Hoistway Door Tracks and Hangers: Retain hatch door hangers and replace rollers as needed. Hatch door tracks are to be retained.

C. Sight Guards: Each Door is to have a secure sight guard.

D. Hoistway Sills: Reuse existing in place. Clean and polish including hoistway side of sill.

E. Fascia Plates: Reuse existing in place. Clean, wire brush and repaint with a rust inhibitive primer. Stencil floor markings with 4” high lettering.

F. Dust Cover: Reuse existing in place. Clean, wire brush and repaint with a rust inhibitive primer.

G. Toe Guard: Retain existing and extended (48") toe guard. Clean toe guard and paint.

H. Handicapped Jamb Marking: Re-use existing in place. On entrances missing Braille plates install new. All Plates must be matching and have a contrasting background.

H. Lobby Pictograph: At all landings, if not existing, provide code compliant elevator corridor call station pictograph “In Case of Fire Elevators are out of Service”. Finish to be stainless to match corridor keypads and/or hall stations.

I. Struts: Clean and tighten.

J. Hangers & Tracks: Retain existing hangers, install new nylon track guides where applicable . Replace rollers as needed with new polyurethane rollers with ball bearings properly sealed to retain grease.

K. Headers: Reuse existing in place. Clean and tighten bolts and other related hardware.

L. Hostway Door Astragals - Replace any damaged rubber astragals with new.

2.10 CAR ENCLOSURE

A. The fronts are to be retained and refinished so that existing returns, transoms and faceplates match new car doors.

B. Elevators 1-7. Refinish cab interior walls and reinstall handrail and retain ceiling.

C. Elevator 8- Include complete new car shell including steel walls, canopy, returns, transom to match current dimensions Also include interior finishes such as 5wl wall panels, ceiling lenses and LED lighting suspended in canopy, side handrail (2 inch) and side bumper rails (4 inches) and new aluminum diamond plate flooring. Check
subflooring and repair before laying new cab walls and front and rear returns. Place underlayment and diamond plate over new cab wall flange.

2.11 PERFORMANCE STANDARDS (48” standard Center Opening)

A. Speed: +/- 3% of contract speed under any loading condition.

B. Capacity: Safely lower, stop and hold up to 125% of rated load.

C. Stopping Accuracy: +/- 1/8"- 1/4" under any loading condition.

D. Door Opening Time: 2.4 seconds from start of opening to 1” from fully open.

E. Door Closing Time: 2.8 seconds from start of close until hoistway interlock engages.

F. Run Time: 5.0 seconds measured from brake pick to brake set after a one floor trip to next successive floor.

G. Full Cycle Time: 10.0 seconds measured from when the doors start to close until they are 2/3 open and car level and stopped at next successive floor under any loading condition or travel direction. Full cycle and run times will vary depending on car speed.

PART 3 – EXECUTION

3.01 PREPERATION

A. Inspection:

1. Verify that hoistway, pit and machine room are ready for work of this Section.
2. Verify shaft openings are of correct size and within tolerances.
3. Verify location and size of machine foundation and position of machine foundation bolts.
4. Confirm electrical power is available and of correct characteristics.
5. Report deficiencies in writing.

B. Arrange for temporary electrical power to be available for installation work and testing of elevator components.

3.02 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered in the manufacturer’s original, unopened, protective packaging and Contractor shall store material in its original protective packaging.

B. The Contractor shall stage all material shipments to coincide with the project schedule and this material must be stored within the Pittsburgh area prior to removing any elevator from service for the purpose of modernization. Contractor must coordinate deliveries and storage of on-site materials with the Building Manager.

3.03 INSTALLATION

A. Hoistway & Machine Room Construction: Contractor shall confirm existing dimensions of machinery rooms, hoistway, and pit, prior to fabricating and installing elevator work. Examine all parts of the supporting structure and the conditions under which the elevator work is installed. Clean and tighten all rail bolts and fish plates.

B. Occupied Building: Most of the work outlined in this specification will be performed in an occupied building. Proper measures should be observed in order to minimize the noise and obstruction in public corridors. If drilling of structure or other potential excessive noise is required, the Contractor shall notify the Designer and obtain permission prior to the commencement of the work. Materials transported from storage areas shall be done so as not to disturb occupants. For any work being performed in the Elevator Lobbies, proper protection must be installed to protect the existing wall and floor finishes.
C. Overtime Work: All material deliveries and removal of trash, equipment, etc. to and from the building elevator machine rooms must be done between the hours of 9pm - 6am or on the weekends. This overtime/shift work is to be included in this bid and a change order will not be issued for any off hours required to perform this work.

3.04 DESIGNER’S FIELD INSTRUCTIONS

A. During construction, the Designer will give field instructions as required without invalidating the Contract.

B. Such field instruction shall not be construed as authority to change the terms of the contract.

C. In cases where extra cost or project scope change of the Contract are involved, the Contractor shall notify the Designer at the time of such instructions and shall establish cost difference and receive written approval before proceeding.

D. The Contractor shall not be reimbursed for extra work unless the above procedure has been followed.

3.05 SITE CLEAN UP

A. Contractor shall remove from site, and legally dispose of, all rubbish resulting from the work under his Contract.

B. Contractor shall provide a separate dumpster located on site as directed by the Designer.

C. Rubbish shall be removed daily and not allowed to accumulate or overflow the dumpster.

3.06 SAFETY

A. Elevator Contractor to be responsible for the maintenance of all safety barricades at hoistway openings from the point they start their work until such time as the hoistway doors are adequately and safely installed and operational.

3.07 CLEANING

A. Remove protective coverings from finished surfaces.

B. Clean surfaces and components ready for inspection.

3.08 ADJUSTING

A. Operate elevators and make necessary adjustments to ensure elevators operate smoothly and accurately.

B. Adjust for smooth acceleration and deceleration of car to ensure passenger comfort.

C. Adjust doors to open only at the landing where the car is stopping or at rest. Ensure the opening sequence begins only when the car is at rest.

D. Adjust automatic floor leveling feature at each floor to achieve $\frac{3}{4}$ inch from flush.

3.09 PROTECTION

A. Protect finished installation under provisions of Section 015000.

B. Locate and protect or lock moveable equipment and controls so they can only be operated by authorized persons.

3.10 ACCEPTANCE & RELIABILITY

A. Copies of all inspection/acceptance certificates and operating permits, as required by governing authorities to allow normal, unrestricted use of equipment, shall be provided when the elevator is accepted for beneficial use.
B. Any special tools required to perform diagnostic tests or to reprogram elevator systems shall be provided to the Owner either through lease or purchase. Contractor shall agree to update software during and after installation as more current versions are developed that affect Code and safety requirements.

3.11 INITIAL COMMISSIONING AND WARRANTY

A. Warranty shall include 8 hour call back service, correcting operation faults and restoring/replacing defective/deteriorated components and finishes, lubricating operational units and supplying expendable materials as required for proper operations. Warranty service shall consist of a minimum of 8 hours per week throughout the one year warranty period starting at Substantial Completion.

1. A service log shall be created and prominently posted per Code requirement. The log shall document: (a) routine inspection, (b) repairs performed, (c) call backs answered and the nature of the call documented, and (d) corrective action. The Contractor shall assign a technician from his service department to be the responsible warranty person and so notify the Designer. The Contractor should not use construction personnel for the upkeep of equipment during construction, however, may use the construction mechanic in charge for emergency repairs or call backs during regular working hours only. Prorate this commissioning agreement based upon cars taken out of service during the modernization process. Contractor is required to submit the resumes for all mechanics within Davidson County that are qualified to maintain the Vendor’s Destination Dispatch system and whom would be available to assume the installation duties for this Building.

3.12 RELATED WORK NOT INCLUDED IN THE WORK OF THIS SECTION

A. As a part of the elevator modernization there will be some building related work items associated with the elevators to meet modernized code requirements. The following survey conditions were noted and will require attention by the general contractor as a part of a turnkey installation. These items will be included under the general contractor and have been detailed in other sections of the specification but are summarized below. The Elevator Contractor is expected to include in their bid IUCE labor cost associated with coordination work with other trades. This includes a reasonable amount of operator and cab placement in order to facilitate other trades to perform their work.

B. Additional scope items required by the elevator contractor are also included below.

C. Additional scope items required by the elevator contractor are also included below. The Elevator Contractor is expected to include in their bid cost associated with coordination work with other trades. This includes a reasonable amount of operator and cab placement in order to facilitate other trades to perform their work.

D. Elevator Related - Includes but is not limited to:

1. Coordinate with Fire Alarm Vendor for testing and connection of contact closures.
2. Elevator lobby, machine rooms, and hoist way / pit smoke detectors, located as required shall be wired from the fire control system to a controller for each group of elevators. A normally closed, potential free (dry) contact rated 120VAC shall be provided for each of the following signals (unless otherwise specified by local code):
   a. Signal to return to the designated landing.
   b. Signal to return to the alternate landing.
   c. Signal to indicate smoke detector in machine room or hoist way / pit active (will require more than one signal per group for split hoist way)
   d. Signal to return to the second alternate landing
   e. Signal to flash the fire hat
3. Provide all necessary electrical work to properly bring modernization up to current ASME and NEC codes. This work includes but is not limited to:
   a. Addition of new secondary disconnects to eliminate line of sight issues in machine rooms and create a lockable disconnect. True ground wire will also be required to terminate in each controller.
   b. Addition of cab light and fan 120V disconnect switches
   c. Connection to 3 phase 480 volt power supply and fused disconnects
   d. Shunt trip devices and heat detectors because sprinklers are present. Sprinklers were found in the elevator machine room but not the hoist ways and as a result “shunt trip" breakers will be required.
e. Replace the emergency power ATS switches and auxiliary dry contacts wired to emergency power supply. Include pre-warning.
   1) With the transfer switch we will need at least one dry normally closed contact on the transfer switch to terminate at the elevator controllers to give a range of 10 – 300 seconds advance notice prior to the application of emergency power. Transfer switch shall provide on adjustable time delay of approximately 20 to 45 seconds for pre-transfer signal in either direction. The elevators can be designed to sequentially operate so that only one elevator is running at a time.

f. Provide separate 110 V- A.C. - 15 Amp rated, single phase power supply with DPST fused disconnect switch and feeder wiring to relay panel for elevator signal system, cab lights and/or rope grippers.

g. Provide GFI outlets in machine room and pit. Proper lighting in machine room and pits to comply with Code.

h. Install new LED lights in machine room to meet proper light levels. Provide covers on all light fixtures. Install new 4 foot LED vapor proof lights in elevator pit (4 fixtures) and in secondary access to replace existing.

i. Elevator pit light switches shall be located adjacent to each elevator pit access ladder approximately 52" above the lowest landing hoistway entrance sill.

j. Connect existing smoke for zoned arrangement.

k. Install true ground wire on all main and auxiliary disconnect switches.

l. Replace pit lights with 4 foot moisture proof LED lights.

m. Secure the phone line, run in conduit and reconnect.

4. Installation of any additional communication cabling that is necessary to meet the specifications for the EMS systems. Include conduit to engineering if required by code for cat 5 cable.

5. Any cutting and patching for hoistway access switches. Bevel any ledges required to meet local AHJ requirements. Eliminate holes in walls and fire caulk as required. Patch hoistway as needed.

6. Wire and all wire pulls to status panel and master phone stations. Reuse existing conduit for Master Rath phone/status panel.


8. Provide a proper grate on the sump hole to meet inspector’s requirements. If existing is acceptable then retain.

9. Emergency power change over and testing will need to occur over a weekend. See electrical Contractor for requirements and IUEC support level required to cover any standby overtime.

10. Painting of door frames

11. Air conditioning and ventilation of machine room space. Provide room environment to ensure reliable operation of micro-processor equipment with temperature range 60-80 degrees F, with 80% non-condensing humidity. Use existing HVAC source and install new exchanger or install new split system HVAC to maintain a temperature range of 60-80 degrees F. HVAC shall may be located within the bounds of the machine room. Preliminary estimates are 14,000 BTU per elevator.

12. Install fire extinguisher

13. Provide dedicated phone line at machine room

14. Equipment room doors must be metal Class B rated doors with closer mechanisms. Doors must be self-closing and self-locking.

15. Water drain line over the controls shall be provided with a drain pan or drain pans if not already present.

16. Replacement of existing flooring with new specified flooring.

3.13 MISCELLANEOUS WORK INCLUDED IN THE WORK OF THIS SECTION

A. Custom Temporary enclosures or other protection from open hoistways (corridor barricades).

B. Connect smoke devices to elevator controllers and testing (on overtime).

C. Test emergency power during overtime hours.

D. Paint all machine room floors and existing machines after installation.

E. Install car top railings on all passenger elevators upon award of contract on all elevators.
F. Paint all pit floors and car tops.

G. Install pit ladders or modify existing ladders to comply with current requirements.

H. Install approved hoistway screening.

I. Furnish and Install cab phones and master intercom station.

END OF SECTION
SECTION 142140

ELEVATOR MODIFICATIONS – RACHAEL JACKSON

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish and install all materials, programming and labor necessary for the elevator modernization herein specified.

B. It is the intention of these specifications to call for finished work, completely tested and ready for the Owner’s operation.

1.02 RELATED DOCUMENTS

A. Section 089120: Louvers to vent shaft. Elevator Contractor will include labor cost to operate the elevator for contractor work associated with this section.

B. Section 092116: Cavity shaft walls.

C. Section 096500: Resilient flooring in cabs with installation specified herein.

D. Section 099000: Finish painting of hoistway doors and frames.

E. Section 260519: Electrical power supplies.

1.03 SUBMITTALS

A. Submit items under provisions of Section 013000.

B. Shop Drawings and Product Data
   1. Product Data: Submit manufacturer’s technical product data and installation instructions for each principal component or product, and include certified test reports on required testing. List and describe features of control system, performances and operating characteristics.
   2. Shop drawings: Illustrating general arrangement and loads of elevator equipment, plans and other details shall be provided. Shop drawing approval must be obtained before proceeding with the fabrication and installation of components. Upon completion of the work, deliver to the Designer, two complete “as installed/built” sets of wiring diagrams covering the products installed. The above documentation shall become the sole property of the Owner.
   3. Samples: Submit fixture samples; cover plates, buttons and hall lantern lens samples (as required by the specification).
   4. Maintenance Manuals: Three (3) bound manuals shall be provided for each group of elevators (high and low rise) to be provided in their respective machine room, with operating and maintenance instructions, parts listing, recommended parts inventory listing, purchase source listing for major and critical components, emergency instructions, and similar information.
   5. Diagnostic Tools and Proprietary Information: The Elevator Contractor shall make available to the Owner the option to lease or purchase any diagnostic “hand held” devices that apply to the elevator systems installed herein. Software upgrades shall be offered to the Owner on an annual basis as a condition of lease/ or purchase. Bidders are requested to identify specifically any information contained in their bids which they consider confidential and/ or proprietary and which they believe to be exempt from disclosure citing specifically the applicable exempting law.
   6. The Designer checking and review of Contractor’s and sub-contractor’s drawings or equipment details does not relieve the Contractor from responsibility for errors, omissions, or equipment characteristics furnished in accordance with such checked or reviewed drawings.
7. The checking of Contractor’s and sub-contractor’s drawings or equipment details by the Designer does not give or transfer any responsibility to the Designer for errors or omissions. Where such errors or omissions are discovered later, they shall be made good by the Contractor irrespective of any review by the Designer.

C. Submit product data on the following items:
   1. Signal and operating fixtures, operating panels and indicators.
   2. Cab design and components.
   3. Electronic equipment to control and monitor elevator control functions.
   4. Two-way communications equipment and signage, data plates and other identification devices required by ANSI A17.1.

D. Submit two 4 x 4 inch minimum size samples of materials and finishes required for cab interior, cab ceiling, cab doors, operating and signal system fixtures and finish of hoistway doors and frames. Provide finish samples to be actual finishes on base material to which it is to be installed.

1.04 QUALITY ASSURANCE

A. Manufacture and Install per Industry Standards:
   2. Comply with applicable code sections related to the latest adopted edition for the State of Tennessee.
   3. Comply with applicable NFPA Codes and specifically with the section relating to electrical work and elevators.
   4. Comply with Title III of the American with Disability Act. Design the elevators to comply with requirements for the handicapped, including clearances, handrails, locations of signal equipment, and similar provisions.
   5. Comply with applicable sections of the National Electric Code relating to electrical work and elevators.
   6. Comply with applicable sections of the current Building Codes for the state of Tennessee.
   7. Meet requirements and provide labels (UL and NEC) for electrical equipment and materials wherever standards have been established and label services are regularly furnished by.

B. Manufacturer: Company specializing in manufacturing elevator equipment with 15 years of documented experience.

C. Installer: Employees and supervisor on payroll of the elevator manufacturer or a licensed franchisee of the elevator manufacturer.

D. Comply with ANSI A17.1 and ANSI C2 and as supplemented in this Section.

E. Door and frame assemblies: Comply with NFPA 80 and UL 10B.

F. Welding: Comply with AWS D1.1.

1.05 SUBSTITUTIONS

A. Product Substitution - Certain manufactured articles specified herein are mentioned under one or more trade or manufacturer’s names. These manufactured articles, as specified, shall form the basis of the contractor’s bid. Additional products will be permitted by addendum only.
   1. Articles of other manufacturers, of equivalent design, quality and capacity, as adjudged by the Designer or the Designer’s Consultant, will be considered no later than ten (10) working days prior to bid date. Establishing proof of the equality of the product to that specified shall be the responsibility of the bidder. Determination of equality of all products is vested in the Designer, whose decision shall be final and binding upon all concerned. No substitutions will be allowed after the Contract is awarded.
   2. Where a Contractor proposes to use an item of equipment other than that specified or detailed in the specification that requires any re-design of any other part of the mechanical, electrical or architectural layout, all such re-design and all new drawings required therefore shall be prepared by the Contractor, at his own expense. And, should this re-design require additional cost to other Contractors, this expense shall be borne by the contractor making such changes. All changes shall be approved by the Owner.
1.06 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 017821.

B. Include description of the elevator system’s method of operation and control including group supervisory control system, motor control system, door operation, signals, special service provisions, emergency power operation, and special or non-standard features provided.

C. Provide parts catalog with a complete list of equipment replacement parts, with equipment description and identifying numbers.

D. Provide a legible schematic of wiring diagrams covering electrical equipment installed, including changes made in the accepted work of this Section, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.

E. Provide one copy each of the following items behind plastic or glass glazing, in a metal frames, mounted adjacent to each other on a machine room wall in a location which is readily accessible for reference.
   1. Master electrical schematic.
   2. Lubrication chart.

1.07 MAINTENANCE MATERIALS

A. Provide one set of the programming tools and testing equipment required for reprogramming and testing of the elevator controller.

1.08 PREINSTALLATION CONFERENCE

A. Convene a pre-installation conference at least one week prior to commencing work of this Section.

B. Require attendance of persons directly involved with the work of this Section.

C. Review schedule of installation, installation procedures and conditions, and coordination with related work.

1.09 WARRANTY

A. Provide a one year manufacturer’s warranty under provisions of Section 017821, commencing at the date of Final Completion of the Project.

B. Include coverage of the elevator system controller and operating equipment and devices.

1.10 TESTS

A. Provide inspection and testing of elevator system.

B. Obtain and pay for municipal and state permits and inspections required.

C. Conduct tests required by governmental agencies.

D. Schedule tests so that the authority having jurisdiction, the Designer, the Owner and the Contractor are all present during tests.
1.11 DELIVERY, STORAGE AND HANDLING

A. Deliver items to the site and handle, store and protect under provisions of Section 016000.
1. Do not deliver materials until the areas in which they are to be installed are ready to receive them.
2. Fully protect movable and operating equipment from the weather.
3. Ensure that factory finishes are wrapped and crated to protect from damage.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Otis Elevator – Elevonic RMH /RM
B. Schindler Elevator Corp. – Miconic TX
C. Kone Elevator - Resolve
D. Thyssen Elevator – TAC 50

2.02 EQUIPMENT SUMMARY TO BE UPGRADED

A. Rachel Jackson Building 320 6th Avenue North

<table>
<thead>
<tr>
<th>Passenger Elevators</th>
<th>Service Elevators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type…………………..</td>
<td>Geared………………</td>
</tr>
<tr>
<td>Number……………….</td>
<td>1-3…………………..</td>
</tr>
<tr>
<td>Manufacturer………….</td>
<td>Dover………………..</td>
</tr>
<tr>
<td>Machine……………..</td>
<td>GD105 Machine……..</td>
</tr>
<tr>
<td>Maintenance Provider</td>
<td>Kone………………….</td>
</tr>
<tr>
<td>Duty…………………..</td>
<td>3500 lbs - 350 fpm</td>
</tr>
<tr>
<td>Control……………..</td>
<td>Group Composite w/ motor generators</td>
</tr>
<tr>
<td>Landings…………….</td>
<td>8…………………….</td>
</tr>
</tbody>
</table>
| Entrances/Size………| Center Open 3'0" x 7'-0"| Center Open 3'0"X 7'0"
| Type Door Operator | HD 73……………….|
| Date of Installation| 1984………………….|

2.03 COMMON TRACTION ELEVATOR ELEMENTS

A. Geared Traction Machine: Retain/ reuse existing geared traction machine gear boxes and deflector sheave assemblies, and electromechanical brakes, in place, and “refurbished”. Refurbishing consists of: seal replacement, thrust bearings and sheave bearings (replace bearings if necessary), flush/ refill oil supplies, replace brake contacts and brake shoe pads. Provide new hoist cables on all elevators. Check sheaves and undercut as needed to minimize wear on new cables.
1. The existing DC motors shall be replaced with a new low-speed A.C. motor. The elevator contractor shall balance dynamically rotating elements. Install new neoprene pads to isolate the machine from the machine beams, if necessary. The design of the new A.C. motor shall exceed, but not more than 5 horsepower, calculated requirements for the specified duty application. Provide calculations pertinent to the sizing of the motor. Bearings shall be of the anti-friction type with suitable means of lubrication and covered inspection holes to permit observation of the distributing mechanisms.
2. Provide regenerative drive option.
3. All Units - New rope guards shall be provided to prevent the ropes from leaving the sheave under any condition, with clearance between the guard and sheave to be less than the rope diameter. Install “ascending car over-speed and unintended car movement” devices per Code requirements found in A17.1- 2010 or current edition.
B. Brake: Check and replace brake pins and bushings as required. Rewind brake coils and re-line brake shoes on all elevators as needed. Replace all springs, actuators and contacts, scrape and paint all of the brake assembly (do not paint pins) to match the machine. The elevator shall stop electrically before the brake shoes apply. A system where slow down and normal stopping is achieved by using the brake, will be rejected. A system of controlled emergency stopping with delayed brake application will be rejected. Assure that brake capacity will hold the car at any landing with 125 percent of contract load and with normal counterbalancing.

C. AC (Regenerative) Drives: Provide within new controller cabinets, new Regenerative AC drives. The drives shall be designed to run new alternating current. hoist motor providing smooth acceleration and deceleration regardless of elevator load. Power generated during overhauling load conditions shall be returned to the building power line. Connect resistance in parallel with the motor armature, to absorb regenerated power, when normal drive power is removed from the motor. Drives shall be designed to be fully isolated from car controller signals and equipped with a “fast acting” fuse to protect against current surges. Acceptable drives systems shall be functional under varying voltage factors of +/- 10%. Drive control systems shall be closed- loop feedback type based primarily on car position. The velocity profile should be calculated by the individual car computer therefore producing a smooth ride and accurate stopping. A machine mounted velocity transducer, spring loaded shall be used to provide continuous comparison machine speed to velocity profile and to car speed.

D. Micro-Processor Control System: Provide micro-processor control systems as defined under “operation” for all elevators covered under this specification section.

E. Operation: Provide new micro-processor based supervisory and car control system capable of efficient system dispatching. The system shall be capable of determining various traffic conditions and assign corridor calls based upon; number of car calls assigned to each elevator, position and condition of each elevator (location in hoistway), direction of travel, accelerating and decelerating, full speed, elevator in by-pass, and elevator at Lobby with next signal. With minimal building traffic, elevators shall be programmed to zone with at least one elevator at the Lobby floor. The system shall be capable of providing priority service to the Lobby during periods of heavy and light traffic demand. Individual elevators shall utilize group dispatching technology capable of providing the best possible service to the Building. It is the intent of the Owner to have security enabled elevator controls either via lobby card readers or in each car. Contractor is to include in their bid provisions for a card access security feature established after contract award.

F. Operation- Group Control:
   1. When the cars are at rest, they shall be assigned throughout the building to predetermined zones. The first car entering a zone shall become assigned to that zone. The car may run through an occupied, assigned zone in search of an unoccupied zone in which to park. While there are no calls registered, the cars shall remain in a parked condition with the doors closed. The lowest zone shall consist of the Lobby and the first upper floor serviced. The remaining floors shall be divided into equal zones with one car randomly assigned to each zone.
   2. Optimized system response should be achieved by means of calculating relative system response and/or aided by artificial intelligence factors. The computation of each elevators response to a call shall be based on, but not limited to, such relevant factors as distance, service to previously assigned car and hall calls, car load, direction, door and car motion status, and coincidence of car or hall calls.
   3. A car without registered car calls arriving at a floor where both up and down hall calls are registered shall initially respond to the hall call in the direction that the car was traveling. If no car call or hall call is registered for further travel in that direction, the car shall close its doors and immediately reopen them in response to the hall call in the opposite direction. Hall lanterns shall indicate the changed direction when the doors reopen. Coincidence calls where a car call and hall call coincide, preference shall be given to assigning the hall call to the car that must already stop at the floor to serve its car call. A twenty (20) second parameter shall be designed into the system whereby an elevator with a car call will receive priority to answer a corresponding corridor call if it can do so within twenty (20) seconds. If it cannot answer the call within the prescribed time, the first available car shall be assigned. A continuous reassessment of calls shall be made, with the processor having a capability of reassessing, a minimum, thirty- two (32) times per second.
   4. The system core memory shall be non volatile (EPROM) capable of storing the following group adjustments:
      a. number of cars required at the Lobby,
      b. number of cars required in the high zone,
      c. up peak traffic detection parameters,
d. minimum peak duration,
e. down peak traffic detection parameters,
f. minimum down peak duration,
g. traffic demand parameters to release the next car,
h. selectable hall waiting time,
i. coincident calls maximum waiting time,
j. the stopping table for all cars with the direction of the stops,
k. security information, and
l. high priority floors.

G. Hoist Cables: All hoist cables are to be replaced and equally tensioned. Verify all cable hitches are wedge type shackles. Load weighing shall be installed either under cab or at the terminus point for the hoist cables on the car top crosshead. Install “ascending car over-speed and unintended car movement” devices per Code requirements found in A17.1- current edition. “Re-groove” traction drive sheave as needed to maintain new hoist ropes.

H. Counterweight: Elevator shall be suitably counterbalanced for smooth and economical operation. Retain (clean and paint) existing counterweight frame and sub-weights. During balancing secure all sub-weights and isolate them to eliminate any detectable movement. The counterweight shall be equal to the complete elevator car and approximately 40 percent of the specified load. Replace rollers on existing guides, refurbish counterweight roller guides by replacing all bushings and rollers as needed. Install roller guide covers on top guide.

I. Compensation: Replace any compensation ropes or Wisperflex that show heavy wear or breaks. Replace any compensation that is cracked or damaged so that it is maintainable. All compensation chains shall be replaced with wisperflex and new roller dampening installed.

J. Governor, Governor Cable & Tail Sheave: Replace the existing governor and governor cable. Provide new governor cables secured to the safety mechanism. At manufactures option retain existing pit mounted governor tail sheaves or replace bearing. As the car reaches a preset speed in the down direction, the governor will trip, applying the safety, and bringing the car to a smooth and gradual stop. Label each governor with appropriate elevator number as well as identifying up and down direction and which governor is for the car or counterweight.

K. Safety Device: Reuse and refurbish existing car safeties. Clean, lubricate and adjust. Perform rated load test upon completion of the modernization.

L. Wiring: Provide new machinery room and hoistway wiring. All wiring and electrical interconnections shall comply with the governing Codes. Insulated wiring shall have flame retardant and moisture proof outer covering, and shall be suspended to relieve strain on individual conductors. Traveling cables shall be of the round type and constructed with a coax cable in the center and capable of handling a minimum of 10 percent spare conductors and contain 8 pairs of shielded wire. At minimum two cables are to be provided meeting the criteria outlined.

M. Terminal Stops: The elevator shall be equipped with new automatic stopping devices, arranged to bring the car to a stop at the terminal landings independent of the regular operating devices in the car. New final limit switches shall be provided in the hoistway, operated by the car and arranged to stop the car and prevent normal operation should it travel beyond the zone of the normal stopping device.

N. Automatic Terminal Limits: New electric limit switches shall be placed in the hatchway near the terminal landings and designed to cut off the electric current and stop the car should it run beyond either terminal landing.

O. Automatic Self-Leveling: The elevator shall be provided with a two-way, self-leveling feature that will automatically bring the car to the floor landings. This self-leveling shall, within its zone, be entirely automatic and independent of the operating device and shall correct for over-travel or under-travel within 1/4” of floor levels. The car shall also be maintained level with the landing irrespective of the load.

P. Pit Switch: A new emergency stop switch shall be located in the pit accessible from the pit door(s) and at required height. Light switch is to be relocated to 48” above finish floor.
Q. Buffers: Refurbish existing buffers. Clean, flush and re-seal. Buffers shall comply with ANSI A-17.1 Code requirements.

R. Car Top Inspection Station: Provide a new car top inspection station with an “emergency stop” switch and with constant pressure “up-down” direction buttons. The device shall make the normal operating devices inoperative and give the inspector complete control of the elevator.

S. Leveling Control:
1. Leveling devices shall be provided with a position selector integrated with the new micro-processor system. Car position in the hoistway shall be digitized through means of a fixed vane. The position transducer shall permit a 0.25 inch resolution accuracy for the entire length of the hoistway. Floor position and slowdown limit position shall be stored in non-volatile memory (EPROM). The position selector shall also be used to determine the car velocity to within +/- 1%.
2. An automatic two-way leveling device shall be provided which will govern the leveling of the car to within 1/8” - 1/4” above or below the landing sill. Any over travel or under travel or rope stretch shall be electrically compensated.

T. Operation Under Group Dispatch Failure: If the group controller goes off-line during normal power, the cars shall emergency dispatch in their assigned zones (determined at initialization of system). Cars not assigned during initialization will respond only to car calls. If the group controller goes off-line while on an emergency power source, the car manually selected to run on emergency power will begin to emergency dispatch at the floors assigned to it during initialization.

U. Independent Service: A switch shall be provided in the car operating station, when actuated, shall disconnect the elevator from hall buttons and permit operation from the car buttons only. If the car is on independent service mode when elevator is recalled by means of SES, a buzzer shall sound in the elevator and a jewel shall be illuminated as required by ANSI.

V. Emergency Fire Fighting Operation:
1. Provide an emergency operation system for use by fire fighting or rescue personnel as specified by ANSI A17.1-2010 edition. Switches shall be clearly identified as to function and shall be arranged and designed to prevent unauthorized use or accidental operation being placed behind locked cabinet within the car operating panel as described in ANSI A17.1-2010.
2. Provide keyed switches in panel at the Ground floor in accordance with ANSI A17.1-2010 edition. Provide SES (Safety Emergency Phase I & II).

W. Special Emergency Service Phase I: Emergency operation to return the elevator to the Ground floor level by means of a key operated switch at the Ground Floor shall be provided in compliance with Code. The key switch shall be mounted integral with new corridor call cover plates- see fixture & signal section.

X. Special Emergency Service Phase II: Within elevator controls of each elevator during the emergency operation, a key switch shall be provided to allow independent use of the elevator by emergency or rescue personnel. Operation as specified by ANSI A-17.1, 2010 edition, shall apply to its operation. Auxiliary contacts in the elevator control panel shall be available for interfacing with the building alarm system.

Y. Elevator capture smoke/heat devices, and their required power supply: to be zoned as follows; Ground Floor, typical elevator landing corridors, and machine room.

Z. Ascending car over-speed and unintended car movement protection: Protection shall be provided with a device to prevent the car from striking the hoistway overhead structure and to prevent unintended car movement away from the landing with the hoistway door not in the locked position. These safety requirements shall operate and function in accordance with the ANSI A17.1 Code. Rope Gripper device is to be mounted in the machine room or at the top of the hoistway as determined by the successful contractor. Any and all steel, structural reinforcement, anchors or fasteners required to mount this device in the contractor’s preferred location shall be by this contractor.
AA. Rails and Brackets: Clean/de-grease rail riding surfaces- main and counter weight, tighten rail bolts and fish plates. Verify rail alignment of horizontal and vertical plumb +/- 1/4 inch for 50 feet linear. Report any variation in rail alignment in order to determine remedial correction.

BB. Roller Type Guide Shoes: Completely re-condition car and counterweight guide shoes and replace all rollers and bushings. Install guide shoe covers. New Guide shoes can be provided in lieu of reconditioning.

CC. Pit Equipment & Car Top Enclosure: Existing pit channels, main car buffer and rails to be painted up to 4’ above the pit floor. Paint pit floor and walls up to 4’ high. Provide a metal car top safety railing on both sides and the rear of the cab, furnish and install an electrical interlock on existing top exit panel (enlarge top exit panel opening if required to meet current code). Scrape and paint existing cab platform, stiles, framing, car top and exterior metal cab shell.

DD. Card Reader devices and control provisions- Include card reader limited access devices and provisions in the car station, control and travel cable. Coordinate installation with security vendor is included. Control is to include necessary card reader software and provisions. Cost for devices are to be included by General Contractor.

EE. Interim Traffic Manager – During the modernization process and after the first elevator is completed and returned to bank operation provide an interim traffic dispatch system that will coordinate dispatching of the elevators between the new and old system. The ITM will stay in place until the last elevator is removed for modernization.

FF. Master Phone Station – Provide a master Rath phone / intercom station adjacent to the status panel or incorporated in the panel at the fire command room. Reuse current conduit for all wire. Electrical contractor to provide 2 inch conduit (wire by Elevator contractor) to lobby for status panel and phone (Reference division 26).

GG. Status Panel- Provide new status panel as detailed in 2.0SF.

2.04 ADDITIONAL CONTROL PROVISIONS

A. Nudging Action: If door opening is obstructed for a predetermined adjustable time (20-30 seconds), a buzzer shall sound and attempt to close doors with a maximum of 2½ foot pounds kinetic energy. Allow door to close after obstruction is removed.

B. Differential Door Time: Provide separately adjustable timers to enable varying time that the doors remain open after stopping in response to calls. In response to a car call- adjustable between 1 to 8 seconds; landing call adjustable between 3-8 seconds. Use landing call timing when responding to coincidental calls.

C. Hoistway Access Switches: An enabling key switch shall be provided in the car operating panel to render all car and hall buttons inoperative and to permit operation of the elevator by means of an access key switch adjacent to the hoistway entrance at the access landing. The movement of the car away from the access landing, other than the lower terminal, by means of the access key switch at the landing shall be limited in travel and direction to that as specified for the upper landing in the latest revision of the ANSI/ASME A-17.1 Code. Contractor to include all cutting and patching for this new fixture. This is not included in related work by others.

D. Out of Group Operation: In the event that a car does not start for a hall call dispatch signal, the car will be removed from group operation after 20 seconds.

E. Auto Light Fan Shutdown: If an elevator has been removed from dispatch operation due to lack of traffic demand and attained a resting zone assignment, power shall be disconnected to the car light and fan circuits. An assignment to the “resting car” will immediately restore electrical circuits to normal operation.

F. Load Weighing: Load weighing switches/cells shall be provided which will function to bypass hall calls when their respective load weighing inputs are energized. Bypass should be established at a setting of 70% of rated load capacity. Load weighing may be used for sensing traffic conditions and used as a parameter to determine dispatching strategy, establish a setting of 50% of rated load capacity for this feature.
G.  Inconspicuous Riser: Provide an IR feature for elevator 4 so that a new single push button riser located at elevator 4 can be run independently from this push button riser. The system will need to have the capability to be turned on and off by a time clock and overridden via key switch located at the 1st floor or through the EMS system.

H.  Elevator Management System (EMS): Supply a hardware and software monitoring system conforming to the following requirements. Provide an integrated display system as manufactured by the approved elevator contractor. Provide a minimum Pentium IV Intel Computer (with Microsoft program), and 17" VGA flat panel color monitor and printer. Elevator position, door position, elevator status, group status, car calls and hall calls shall be displayed. Provide visual and audible signal in the event an elevator is removed from service. Provide means to remove elevators from service, inhibit hall and car calls on an individual basis. The system processor shall be capable of providing log of events which affect the operation of the elevators, including events indicating elevators are not removed from service. Provide record of hall call durations. Records shall be stored in 15- minute increments with a minimum of 30 days of data stored in one file. Provide a means to print summary of events and monitoring data. Provide one unit that is capable of being connected via IP address at Andrew Jackson.

2.05  SIGNAL EQUIPMENT

A.  General: Except as otherwise indicated, provide manufacturer’s custom signal equipment for each elevator or group of elevators. Provide new car control stations (main and auxiliary), car position indicator in each car to replace existing, hall push-button stations on each landing (two separate push button risers). Provide illuminated buttons and signals, which light-up when activated and remain lit until the call or other function has been fulfilled; fabricate of acrylic or other permanent translucent plastic. Except for buttons and illuminated signal elements, fabricate buttons with matching metal finish. Except for buttons and illuminated signal elements, fabricate signal equipment with exposed surfaces of stainless steel with manufacturer’s standard directional polish or satin finish. All new buttons to be LED illuminated with halo design.

B.  Car Control Stations: Replace the cab front return and transom with new #4 stainless steel swing front with integral fixtures- no faceplate. Provide new flush-mounted metal panels, containing call buttons for each landing served, and containing other buttons, switches and controls required for specified car operation and control. All call buttons to be custom designed and illuminated. Manufacture and mount at height complying with “ADA Minimum Requirements for the Handicapped”, including hands free phones. Provide operating device symbols as required by Code. Mark other buttons and switches with identification for required use or function. COP’s should come from the factory with engraving identifying the Elevator Number at the top.

C.  Corridor Call Stations: Provide at each terminal landing a single push button and at each intermediate landing, a button fixture shall be provided containing “UP” and “DOWN” push buttons. Match current number of risers. Fixture shall be designed to cover the existing wall openings and installed flush with the finished wall line (elongated type fixture must be provided to cover existing openings and lower call stations to meet ADA requirements). Buttons shall match design and finish of car stations. Include new IR Riser for car 4 in jamb.

D.  Hall Lanterns: Retain existing hall direction lantern box and, replace faceplate, lens and lamp with new LED lamp and install electronic tone device, which, when the car stops and the doors are opening, shall indicate the direction in which the car is traveling. A double stoke electronic chime shall also be furnished which will sound once for the “UP” direction and twice for the “DOWN” direction as the doors are opening.

E.  Lobby PI: Replace corridor position indicators at levels 1 and G with new LED 2.5” Digital PI fixture to cover existing. Faceplate must be at least ½ inch larger width and height then existing. Flush mounted fixture.

F.  Ground Floor Fire Command Panel: Provide a new fire command and emergency power selection panel adjacent to designated fire panel at main lobby. Panel shall include PI and required switches as well as master phone station to allow emergency personnel to communicate to each elevator. Include master phone station to access all elevators via the Rath or equal phone / intercom. 2 inch conduit between elevator hoistway and lobby by GC (reference division 26).
G. Emergency Signal Bell: A new car emergency signal bell shall be provided of the “monitor type” suitable for outlet box mounting. The bell shall be arranged to sound when the emergency button in the car is pressed. The bell shall be mounted in the hoistway at the lowest landing.


I. Emergency Car Lighting: An emergency power unit employing 1 12-volt sealed rechargeable battery and totally static circuits shall be provided that shall illuminate the elevator car and provide current to the alarm bell in the event of normal power failure. The equipment shall comply with the requirements of the ANSI/ASME Code.

J. Cab fan: Furnish and install a new 2-speed Morrison type cab fan.

2.06 SPECIAL DESIGN CRITERIA

A. Design for the handicapped:
   2. Locate uppermost button in the cab control panel and the centerline of the telephone handset to be not more than 54 inches above the cab floor.
   3. Sound audible soft-tone signal in car when car is stopping or stopped at a floor.
   4. Provide hall gongs which sound once for up stops and twice for down stops.
   5. In each cab, provide 7/8 inch high Arabic numerals raised .03 inches from the surface and Braille numerals immediately to the left of floor buttons to identify floor.
   6. At each floor landing, provide 2 inch high Arabic numerals raised .03 inches from the surface and Braille numerals on each door jamb.

2.07 MATERIALS

A. Rolled steel sections, shapes and rods: ASTM A36.

B. Sheet steel: ASTM A446, Grade B, zinc coated to ASTM A526 G90 coating designation.

C. Stainless steel: ASTM A167, Type 304, No. 4 finish.

D. Aluminum: Anodizing quality, alloy as follows:
   1. Extruded material: ASTM B221 6063.
   2. Sheet material: ASTM B209 5005.

E. Plywood: APA rated sheathing, 32/16 span rating, Exposure 1, sanded, fire retardant treated.

F. Particleboard: CS 236 high density type, composed of wood chips and waterproof resin binders, of grade to suit the application, with sanded faces.

G. Wall Protection: Refer to sheet RJF1.01.

H. Primers:
   2. Plain steel surfaces: Zinc chromate alkyd type.

I. Paint: Semi-gloss alkyd enamel of colors selected.

2.08 CAR DOOR OPERATION AND CONTROLS

A. Door Operator: Furnish and install a new direct current "closed-loop", motor-driven, heavy duty operator, designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel, and the door operating mechanism shall be arranged for manual operation in event of power failure.
The leading edge of each leaf of the car door shall be provided with a retractable reversal edge arranged to automatically return car and hoistway doors to the open position in the event the doors are obstructed during closing cycle. Doors will then resume closing cycle. Doors shall automatically open as the car arrives at the landing, and shall automatically close after an adjustable time interval or when the car is dispatched to another landing. Direct drive geared operators, A.C. controlled units with oil checks, or other deviations from the above are not acceptable. Provide MOVFR type operator or manufacturer’s equivalent.

B. Interlocks: Remove existing and provide new hoistway door interlocks, tested as required by Code. The interlock shall be designed to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by Code, and shall prevent opening the doors at any landing from the corridor side, unless the car is at rest at that landing or is in the leveling zone and stopping at that landing. Interlocks shall bear Underwriters’ Laboratories “B” label of approval. Replace all closers as necessary and replace car gate switches with new. Install new related cables as needed. Install new clutch.

C. Car Door Hangers and Tracks: Provide new car doors, new hangers and car door tracks. Clean surfaces and tighten bolts and related hardware that are re-used. Provide new polyurethane rollers with ball bearings properly sealed to retain grease. This includes replacement of all car doors.

D. Door Zone Restriction Devices: Provide door open restriction devices on all doors per ANSI/ASME A17.1 Code. Doors will be mechanically restricted from opening unless the elevator car is in the designated unlocking zone. Hatch latch restrictors are not acceptable.

E. Static Type Door Edges: Provide new non-retractable proximity type door edges that, upon sensing an obstruction in the entrance within a range of 5 inches causes doors to stop and reopen. Door detector devices as manufactured by Janus “Pan 40 3D” and/or approved equal. Door close shall be arranged to start within a time consistent with ADA requirements from notification that a car is answering a hall call. Doors shall be arranged to remain open for a time period sufficient to meet ADA requirements.

2.09 HOISTWAY ENTRANCES

A. Hoistway Door Panels & Frames: Re-use existing in place. All doors to have hoistway escutcheon access keyway. All hatch doors to have sight guards securely installed.

B. Hoistway Door Tracks and Hangers: Replace all hatch door hangers and rollers. Hatch door tracks are to be retained.

C. Sight Guards: Each Door is to have a secure sight guard.

D. Hoistway Sills: Reuse existing in place. Clean and polish including hoistway side of sill.

E. Fascia Plates: Reuse existing in place. Clean, wire brush and repaint with a rust inhibitive primer. Stencil floor markings with 4” high lettering.

F. Dust Cover: Reuse existing in place. Clean, wire brush and repaint with a rust inhibitive primer.

G. Toe Guard: Remove existing and replace with new extended (48”) toe guard per A17.1 ANSI Code- 2010 edition. If pit depth does not allow for 48” then reduce to accommodate.

H. Handicapped Jamb Marking: Install new Braille plates on each jamb. All Plates must be matching and have a contrasting background.

I. Lobby Pictograph: At all landings, if not existing, provide code compliant elevator corridor call station pictograph “In Case of Fire Elevators are out of Service”. Finish to be stainless to match corridor push buttons.

J. Headers: Reuse existing in place. Clean and tighten bolts and other related hardware.

K. Hoistway Door Astragals - Replace any damaged rubber astragals with new.
L. Struts: Clean and tighten.

M. Hangers & Tracks: Retain existing hangers, install new nylon track guides where applicable. Replace rollers with new polyurethane rollers with ball bearings properly sealed to retain grease.

N. Interlocks: Replace existing hoistway door interlock as specified. See above.

2.10 CAR ENCLOSURE

A. As part of the base bid replace complete cab front including transom, full swing front returns and car doors with new #4 stainless steel finish. Car stations to be integral and flush with new fronts.

B. Elevators 1-4. Install complete cab interior including walls, ceiling and handrails as detailed on sheet RJ F1.01. Repair subfloor as needed to accommodate new floor. Replace car threshold.

2.11 PERFORMANCE STANDARDS (42” standard Center Opening)

A. Speed: +/- 3% of contract speed under any loading condition.

B. Capacity: Safely lower, stop and hold up to 125% of rated load.

C. Stopping Accuracy: +/- 1/8” - 1/4” under any loading condition.

D. Door Opening Time: 2.4 seconds from start of opening to 1” from fully open.

E. Door Closing Time: 2.8 seconds from start of close until hoistway interlock engages.

F. Run Time: 5.5 seconds measured from brake pick to brake set after a one floor trip to next successive floor.

G. Full Cycle Time: 10.5 seconds measured from when the doors start to close until they are 2/3 open and car level and stopped at next successive floor under any loading condition or travel direction. Full cycle and run times will vary depending on car speed.

PART 3 – EXECUTION

3.01 PREPERATION

A. Inspection:
   1. Verify that hoistway, pit and machine room are ready for work of this Section.
   2. Verify shaft openings are of correct size and within tolerances.
   3. Verify location and size of machine foundation and position of machine foundation bolts.
   4. Confirm electrical power is available and of correct characteristics.
   5. Report deficiencies in writing.

B. Arrange for temporary electrical power to be available for installation work and testing of elevator components.

3.02 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered in the manufacturer’s original, unopened, protective packaging and Contractor shall store material in its original protective packaging.

B. The Contractor shall stage all material shipments to coincide with the project schedule and this material must be stored within the Pittsburgh area prior to removing any elevator from service for the purpose of modernization. Contractor must coordinate deliveries and storage of on-site materials with the Building Manager.
3.03 INSTALLATION

A. Hoistway & Machine Room Construction: Contractor shall confirm existing dimensions of machinery rooms, hoistway, and pit, prior to fabricating and installing elevator work. Examine all parts of the supporting structure and the conditions under which the elevator work is installed. Clean and tighten all rail bolts and fish plates.

B. Occupied Building: Most of the work outlined in this specification will be performed in an occupied building. Proper measures should be observed in order to minimize the noise and obstruction in public corridors. If drilling of structure or other potential excessive noise is required, the Contractor shall notify the Designer and obtain permission prior to the commencement of the work. Materials transported from storage areas shall be done so as not to disturb occupants. For any work being performed in the Elevator Lobbies, proper protection must be installed to protect the existing wall and floor finishes.

C. Overtime Work: All material deliveries and removal of trash, equipment, etc. to and from the building elevator machine rooms must be done between the hours of 9pm - 6am or on the weekends. This overtime/shift work is to be included in this bid and a change order will not be issued for any off hours required to perform this work.

3.04 DESIGNER’S FIELD INSTRUCTIONS

A. During construction, the Designer will give field instructions as required without invalidating the Contract.

B. Such field instruction shall not be construed as authority to change the terms of the contract.

C. In cases where extra cost or project scope change of the Contract are involved, the Contractor shall notify the Designer at the time of such instructions and shall establish cost difference and receive written approval before proceeding.

D. The Contractor shall not be reimbursed for extra work unless the above procedure has been followed.

3.05 SITE CLEAN UP

A. Contractor shall remove from site, and legally dispose of, all rubbish resulting from the work under his Contract.

B. Contractor shall provide a separate dumpster located on site as directed by the Designer.

C. Rubbish shall be removed daily and not allowed to accumulate or overflow the dumpster.

3.06 SAFETY

A. Maintain all safety barricades at hoistway openings from the point they start their work until such time as the hoistway doors are adequately and safely installed and operational.

3.07 CLEANING

A. Remove protective coverings from finished surfaces.

B. Clean surfaces and components ready for inspection.

3.08 ADJUSTING

A. Operate elevators and make necessary adjustments to ensure elevators operate smoothly and accurately.

B. Adjust for smooth acceleration and deceleration of car to ensure passenger comfort.
C. Adjust doors to open only at the landing where the car is stopping or at rest. Ensure the opening sequence begins only when the car is at rest.

D. Adjust automatic floor leveling feature at each floor to achieve 1/4 inch from flush.

### 3.09 PROTECTION

A. Protect finished installation under provisions of Section 015000.

B. Locate and protect or lock moveable equipment and controls so they can only be operated by authorized persons.

### 3.10 ACCEPTANCE & RELIABILITY

A. Copies of all inspection/acceptance certificates and operating permits, as required by governing authorities to allow normal, unrestricted use of equipment, shall be provided when the elevator is accepted for beneficial use.

B. Any special tools required to perform diagnostic tests or to reprogram elevator systems shall be provided to the Owner either through lease or purchase. Contractor shall agree to update software during and after installation as more current versions are developed that affect Code and safety requirements.

### 3.11 INITIAL COMMISSIONING AND WARRANTY

A. Warranty shall include 8 hour call back service, correcting operation faults and restoring/replacing defective/deteriorated components and finishes, lubricating operational units and supplying expendable materials as required for proper operations. Warranty service shall consist of a minimum of 8 hours per week throughout the one year warranty period starting at Substantial Completion.

1. A service log shall be created and prominently posted per Code requirement. The log shall document (a) routine inspection, (b) repairs performed, (c) call backs answered and the nature of the call documented, and (d) corrective action. The Contractor shall assign a technician from his service department to be the responsible warranty person and so notify the Designer. The Contractor should not use construction personnel for the upkeep of equipment during construction, however, may use the construction mechanic in charge for emergency repairs or call backs during regular working hours only. Prorate this commissioning agreement based upon cars taken out of service during the modernization process. Contractor is required to submit the resumes for all mechanics within Davidson County that are qualified to maintain the Vendor’s Destination Dispatch system and whom would be available to assume the installation duties for this Building.

### 3.12 RELATED WORK NOT INCLUDED IN THE WORK OF THIS SECTION

A. As a part of the elevator modernization there will be some building related work items associated with the elevators to meet modernized code requirements. The following survey conditions were noted and will require attention by the general contractor as a part of a turnkey installation. These items will be included under the general contractor and have been detailed in other sections of the specification but are summarized below.

B. The Elevator Contractor is expected to include in their bid cost associated with coordination work with other trades. This includes a reasonable amount of operator and cab placement in order to facilitate other trades to perform their work.

C. Elevator Related - Includes but is not limited to:

1. Coordinate with Fire Alarm Vendor for testing and connection of contact closures.
2. Elevator lobby, machine rooms, and hoist way / pit smoke detectors, located as required shall be wired from the fire control system to a controller for each group of elevators. A normally closed, potential free (dry) contact rated 120VAC shall be provided for each of the following signals (unless otherwise specified by local code):
   a. Signal to return to the designated landing.
   b. Signal to return to the alternate landing.
c. Signal to indicate smoke detector in machine room or hoist way / pit active (will require more than one signal per group for split hoist way)

d. Signal to return to the second alternate landing

e. Auxiliary contact to flash the fire hat

3. Provide all necessary electrical work to properly bring modernization up to current ASME and NEC codes. This work includes but is not limited to:

a. Addition of any secondary disconnects to eliminate line of sight issues in machine rooms. True ground wire will also be required to terminate in each controller.

b. Installations of shunt trip breakers do to sprinklers in the elevator MR and/or hoistways.

c. Addition of cab light and fan 120V fused disconnect switches

d. Connection to 3 phase 480 volt power supply and fused disconnects

e. Replace or modify, if necessary, emergency power ATS switches and auxiliary dry contacts wired to emergency power supply.

f. Provide separate 110 V- A.C. - 15 Amp rated, single phase power supply with DPST fused disconnect switch and feeder wiring to relay panel for elevator signal system, cab lights and/or rope grippers.

g. Provide GFI outlets in machine room and pit. Proper lighting in machine room and pits to comply with Code. Add new lights in machine room to meet proper light levels. Provide covers on all retained light fixtures.

h. Connect existing smoke and heat sensors for zoned arrangement or shunt trip.

i. Install true ground wire on all main and auxiliary disconnect switches.

j. Replace pit lights with 4 foot moisture proof led lights.

4. Installation of any additional communication cabling that is necessary to meet the specifications for the EMS systems.

5. Any cutting and patching for hoistway access switches. Patch any holes or bevel any ledges in the hoistway.

6. Wire and all wire pulls to status panel and master phone stations. Reuse existing conduit for Master Rath phone / status panel if applicable. New 2 inch conduit from elevator 3 to lobby fire panel by GC

7. Installation of hoistway ventilation to the outside. This includes removal of smoke holes and venting to the outside.

8. Removal of existing ventilation system


10. Air conditioning and ventilation of machine room space. Provide room environment to ensure reliable operation of micro-processor equipment with temperature range 70-80 degrees F. with 70% non-condensing humidity.

11. Install fire extinguisher

12. Provide dedicated phone line at machine room

13. Replacement of carpet

3.13 MISCELLANEOUS WORK INCLUDED IN THE WORK OF THIS SECTION

A. Custom Temporary enclosures or other protection from open hoistways (corridor barricades).

B. Connect smoke devices to elevator controllers and testing (on overtime).

C. Test emergency power during overtime hours

D. Paint all machine room floors and existing machines after installation.

E. Install car top railings on all passenger elevators upon award of contract on all elevators.

F. Paint all pit floors and car tops.

G. Install pit ladders or modify existing ladders to comply with current requirements.

H. Provide crane access as needed to move equipment, materials and remove old equipment.
I. Install approved hoistway screening.

J. Furnish and Install cab phones and master intercom station.

END OF SECTION
1.01 DESCRIPTION OF WORK

A. Furnish and install all materials, programming and labor necessary for the elevator modernization herein specified.

B. It is the intention of the Contract Documents to call for finished work, completely tested and ready for the Owner’s operation.

1.02 RELATED DOCUMENTS

A. Section 089100: Louvers to vent shaft. Elevator Contractor will include labor cost to operate the elevator for contractor work associated with this section.

B. Section 092116: Cavity shaft walls.

C. Section 096500: Resilient flooring in cabs with installation specified herein.

D. Section 099100: Finish painting of hoistway doors and frames.

E. Section 260519: Electrical power supplies.

1.03 SUBMITTALS

A. Submit items under provisions of Section 013000.

B. Shop Drawings and Product Data
   1. Product Data: Submit manufacturer’s technical product data and installation instructions for each principal component or product, and include certified test reports on required testing. List and describe features of control system, performances and operating characteristics.
   2. Shop drawings: Illustrating general arrangement and loads of elevator equipment, plans and other details shall be provided. Shop drawing approval must be obtained before proceeding with the fabrication and installation of components. Upon completion of the work, delivery to the Designer, two complete “as installed/ built” sets of wiring diagrams covering the products installed. The above documentation shall become the sole property of the Owner.
   3. Samples: Submit fixture samples; cover plates, buttons and hall lantern lens samples (as required by the specification).
   4. Maintenance Manuals: Three (3) bound manuals shall be provided for each group of elevators or those of similar design and duty, with operating and maintenance instructions, parts listing, recommended parts inventory listing, purchase source listing for major and critical components, emergency instructions, and similar information.
   5. Diagnostic Tools and Proprietary Information: The Elevator Contractor shall make available to the Owner the option to lease or purchase any diagnostic “hand held” devices that apply to the elevator systems installed herein. Software upgrades shall be offered to the Owner on an annual basis as a condition of lease/ or purchase. Bidders are requested to identify specifically any information contained in their bids which they consider confidential and/ or proprietary and which they believe to be exempt from disclosure citing specifically the applicable exempting law.
   6. The Designer checking and review of Contractor’s and sub-contractor’s drawings or equipment details does not relieve the Contractor from responsibility for errors, omissions, or equipment characteristics furnished in accordance with such checked or reviewed drawings.
7. The checking of Contractor’s and sub-contractor’s drawings or equipment details by the Designer does not give or transfer any responsibility to the Designer for errors or omissions. Where such errors or omissions are discovered later, they shall be made good by the Contractor irrespective of any review by the Designer.

C. Submit product data on the following items:
   1. Signal and operating fixtures, operating panels and indicators.
   2. Cab design and components.
   3. Electronic equipment to control and monitor elevator control functions.
   4. Two-way communications equipment and signage, data plates and other identification devices required by ANSI A17.1.

D. Submit two 4 x 4 inch minimum size samples of materials and finishes required for cab interior, cab ceiling, cab doors, operating and signal system fixtures and finish of hoistway doors and frames. Provide finish samples to be actual finishes on base material to which it is to be installed.

1.04 QUALITY ASSURANCE

A. Manufacture and Install per Industry Standards:
   2. Comply with applicable code sections related to the latest adopted edition for the State of Tennessee.
   3. Comply with applicable NFPA Codes and specifically with the section relating to electrical work and elevators.
   4. Comply with Title III of the American with Disability Act. Design the elevators to comply with requirements for the handicapped, including clearances, handrails, locations of signal equipment, and similar provisions.
   5. Comply with applicable sections of the National Electric Code relating to electrical work and elevators.
   6. Comply with applicable sections of the BOCA and/or Standard Building Codes relating to elevators.
   7. Meet requirements and provide labels (UL and NEC) for electrical equipment and materials wherever standards have been established and label services are regularly furnished by.

B. Manufacturer: Company specializing in manufacturing elevator equipment with 15 years of documented experience.

C. Installer: Employees and supervisor on payroll of the elevator manufacturer or a licensed franchisee of the elevator manufacturer.

D. Comply with ANSI A17.1 and ANSI C2 and as supplemented in this Section.

E. Door and frame assemblies: Comply with NFPA 80 and UL 10B.

F. Welding: Comply with AWS D1.1.

1.05 SUBSTITUTIONS

A. Product Substitution - Certain manufactured articles specified herein are mentioned under one or more trade or manufacturer’s names. These manufactured articles, as specified, shall form the basis of the contractor’s bid. Additional products will be permitted by addendum only.
   1. Articles of other manufacturers, of equivalent design, quality and capacity, as adjudged by the Consultant, will be considered no later than ten (10) working days prior to bid date. Establishing proof of the equality of the product to that specified shall be the responsibility of the bidder. Determination of equality of all products is vested in the Consultant, whose decision shall be final and binding upon all concerned. No substitutions will be allowed after the Contract is awarded.
   2. Where a Contractor proposes to use an item of equipment other than that specified or detailed in the specification that requires any re-design of any other part of the mechanical, electrical or architectural layout, all such re-design and all new drawings required therefore shall be prepared by the Contractor, at his own expense. And, should this re-design require additional cost to other Contractors, this expense shall be borne by the contractor making such changes. All changes shall be approved by the Owner.
1.06 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 017821.

B. Include description of the elevator system’s method of operation and control including group supervisory control system, motor control system, door operation, signals, special service provisions, emergency power operation, and special or non-standard features provided.

C. Provide parts catalog with a complete list of equipment replacement parts, with equipment description and identifying numbers.

D. Provide a legible schematic of wiring diagrams covering electrical equipment installed, including changes made in the accepted work of this Section, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.

E. Provide one copy each of the following items behind plastic or glass glazing, in a metal frames, mounted adjacent to each other on a machine room wall in a location which is readily accessible for reference.
   1. Master electrical schematic.
   2. Lubrication chart.

1.07 MAINTENANCE MATERIALS

A. Provide one set of the programming tools and testing equipment required for reprogramming and testing of the elevator controller.

1.08 PREINSTALLATION CONFERENCE

A. Convene a pre-installation conference at least one week prior to commencing work of this Section.

B. Require attendance of persons directly involved with the work of this Section.

C. Review schedule of installation, installation procedures and conditions, and coordination with related work.

D. Review temporary use of cab designated for temporary use, including hours of use, scheduling of its use, cleanliness of cab, employment of operator, and maintenance of system.

1.09 WARRANTY

A. Provide a one year manufacturer’s warranty under provisions of Section 017821, commencing at the date of Final Completion of the Project.

B. Include coverage of the elevator system controller and operating equipment and devices.

1.10 TESTS

A. Provide inspection and testing of elevator system.

B. Obtain and pay for municipal and state permits and inspections required.

C. Conduct tests required by governmental agencies.

D. Schedule tests so that the authority having jurisdiction, the Designer, the Owner and the Contractor are all present during tests.
1.11 DELIVERY, STORAGE AND HANDLING

A. Deliver items to the site and handle, store and protect under provisions of Section 016000.
   1. Do not deliver materials until the areas in which they are to be installed are ready to receive them.
   2. Fully protect movable and operating equipment from the weather.
   3. Ensure that factory finishes are wrapped and crated to protect from damage.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Otis Elevator.
B. Schindler Elevator Corp.
C. Thyssen Elevator.
D. Kone Elevator.

2.02 EQUIPMENT SUMMARY

West Tennessee Regional Health 295 Summer Drive, Jackson, TN

Type ................................................ Hydraulics – In Ground
Number .............................................. 1 and 2
Manufacturer ........................................ US
Machine ............................................. Dry Power Units with Pump/Motor Stand
Maintenance Provider ....................... Kone
Duty .................................................. 2500 lbs – 100 fpm
Control ............................................... Each unit is simplex – Relay
Landings .............................................. 1-2 (2 Landings)
Entrances/Size ...................................... 1 - Center Open, 2 – 2SSO 3'-0" x 7'-0" and 46" x 7'-0"
Type Door Operator ......................... MAC Closed Door Operator
Date of Installation ............................ 1974

2.03 COMMON HYDRAULIC ELEVATOR ELEMENTS

A. Power Unit – Provide a new submersible power unit in a self-contained assembly consisting of oil tank, a motor, pump, oil control valve and suction line strainer. Include a heater/cooling element in each tank with thermostatic controls. The submersible drive assembly should consist of a directly coupled pump and motor isolated from the tank by rubber vibration mounts. The pump shall be of positive displacement screw type, designed for steady discharge and minimum pulsation. The motor used shall be rated at 80 starts per hour at 130% nominal horsepower in 158 degrees F. oil (electronic line starting) and 120 starts per hour at 100% nominal horsepower in 158 degrees F. oil. A bimetallic thermal protection to prevent system damage from overheating due to phase reversal or loss shall be provided. A control valve shall regulate the flow of oil between the power unit and the jack. Advise if HP size is larger than existing.

1. The valve shall contain, in one unit, up and down valves, two-way leveling, relief and check functions, all of which are controlled by four solenoid valves. A screen type suction line strainer shall be located at the suction line to the pump to keep foreign material that might be present in the oil from making its way into the pump. A muffler shall be installed to replace the existing (within the oil line piping) to provide reduction in noise transmission to the car caused by oil pulsations that originate in the power unit. Provide steel pipe of the proper size for the power unit, grooved fittings and a shut off valve. Provide an oil tank of oblong “V” bottom sheet steel designed to store the pumping equipment and oil. Pump motor shall be an A.C. Poly-phase, 1800 RPM, 480 Volt, 3 Phase-60 Hertz, open drip-proof frame. Insulation to be Class B, 90 degree Celsius temperature rise from 40 degrees Celsius ambient. A phase monitor relay shall be provided.
B. Micro Processor Controller- Provide manufacturer’s standard controller for Group operation. The controller shall consist of four (4) function modules; power module, car station floor controller boards, hallway floor controller boards, and door operator controller boards. Programmable options and parameters shall be stored in nonvolatile memory. As a minimum, there shall be 32- character alphanumeric display used for programming and diagnostics.

C. Other Controller Features- Elevators shall not require the functioning or presence of the microprocessor to operate on car top inspection to provide a reliable means of moving the car if the microprocessor fails. A motor limit timer function shall be provided which, in case of the pump motor being energized longer than a predetermined time, shall cause the car to descent to the lowest landing and park, open the doors automatically and then close them. Car calls shall be canceled and the car taken out of service automatically. Operation may be restored by cycling the main line disconnect switch or putting the car on inspection operation. Door reopening devices shall remain operative. A selector switch shall be provided on the controller to select high or low speed during inspection operation. The controller shall include absolute floor encoding, which upon power up, shall move the car to the closest floor to identify the position of the elevator.

D. Soft start line starter- Provide electronic “soft start” line starter device to reduce initial starting current.

E. Leveling control- Existing mechanical leveling devices shall be removed and replaced with a new digital feedback system integrated with the new microprocessor system and drive.

F. Jack Unit Assembly- Reuse/ retain existing jack unit assembly. Sand cylinder surface with light emery, provide new cylinder seals and pressure test units for leaks under full load conditions. Check for plumb, review and make necessary repairs or adjustments.

G. Piping & Victaulic- Reuse existing overhead oil lines and replace existing couplers with new as needed. If building was built to seismic requirements then include rupture valve. Paint all pipe to match new equipment. Replace all Victaulic seals. Oil Coolers- are not required on this project.

H. Independent Service- A switch shall be provided in the car operating station of each elevator which, when actuated, shall disconnect the elevator from hall buttons and permit operation from the car buttons only. If the car is in independent service mode when elevators are recalled by means of SES, a buzzer shall sound in the elevator and a jewel shall be illuminated as required by ANSI Rule 2.27.3.

I. Emergency Fire Fighting Operation- Provide operation as described in next section.

J. Guide Rails & Guide Assemblies- Thoroughly clean all guide rails of grease, oil and other foreign substances. Replace slide guides with new solid guides with nylon inserts. If current guide does not provide sufficient support then replace with larger size guide.

K. Fascia & Toe Guards- Reuse existing hoistway fascia plates- clean, paint with rust inhibitive primer, and tighten. Properly mark to identify hoistway with numerals representative of floor landings. Provide extended toe guard as required by code and permitted with existing pit up to 24”

L. Wiring: Provide new machinery room and hoistway wiring. All wiring and electrical interconnections shall comply with the governing Codes. Insulated wiring shall have flame retardant and moisture proof outer covering, and shall be suspended to relieve strain on individual conductors. Traveling cables shall be capable of handling a minimum of 10 percent spare conductors and contain 6 pairs of shielded wire.

M. Automatic Self-Leveling: The elevator shall be provided with a two-way, self-leveling feature that will automatically bring the car to the floor landings. This self-leveling shall, within its zone, be entirely automatic and independent of the operating device and shall correct for over-travel or under-travel within 1/2” of floor levels. The car shall also be maintained level with the landing irrespective of the load.

N. Pit Switch: A new emergency stop switch shall be located in the pit accessible from the pit ladder and at required height.
O. Buffers: Reuse existing buffers. Clean and paint. Buffers shall comply with ANSI A-17.1 Code requirements. Pit floor shall also be painted.

P. Car Top Inspection Station: Provide a new car top inspection station with an “emergency stop” switch and with constant pressure “up-down” direction buttons. The device shall make the normal operating devices inoperative and give the inspector complete control of the elevator. Include new car top railing also if space between cab wall and hoistway exceed 18”.

Q. Emergency Fire Fighting Operation:
   1. Provide an emergency operation system for use by firefighting or rescue personnel as specified by ANSI A17.1-current edition, Section 2.27. Switches shall be clearly identified as to function and shall be arranged and designed to prevent unauthorized use or accidental operation being placed behind locked cabinet within the car operating panel as described in 2.27.3.3.7.
   2. Provide keyed switches in panel at the Lobby floor for each elevator in accordance with ANSI A17.1- current edition, Section 2.27. Provide SES (Safety Emergency Phase I & II).

R. Special Emergency Service Phase I: Emergency operation to return the elevator to the Lobby floor level by means of a key operated switch at the lobby shall be provided in compliance with Code. The key switch shall be mounted integral with new corridor call cover plates- see fixture & signal section.

S. Special Emergency Service Phase II: Within elevator controls of each elevator during the emergency operation, a key switch shall be provided to allow independent use of the elevator by emergency or rescue personnel. Operation as specified by ANSI A-17.1, 2010 or current edition, Section 2.27 shall apply to its operation. Auxiliary contacts in the elevator control panel shall be available for interfacing with the building alarm system.

T. Elevator capture smoke/ heat devices, and their required power supply, to be zoned as follows; Lobby, typical elevator landing corridors, and machine room. Provide auxiliary modules to flash fire hat in car and at main lobby egress.

U. Battery Lowering: Provide a means by battery or UPS to lower the elevator in the event of a power failure.

2.04 PERFORMANCE STANDARDS:

A. Speed: +/- 3 % of contract speed under any loading condition.

B. Capacity: Safely lower, stop and hold up to 125 % of rated load.

C. Stopping Accuracy: +/- 1/8- 1/4” under any loading condition.

D. Door Opening Time: 2.4 seconds from start of opening to 1” from fully open.

E. Door Closing Time: 3.0 seconds from start to close until hoistway interlock engages.

F. Force Limiting Operation: Provide means to limit the door pressure while closing to a maximum or 30 pounds (measured from rest) and a maximum of 7.5 foot- pounds kinetic energy. Provide means to reduce the force exerted on the doors during a stall condition. Door pressure shall be zero pounds after one second.

G. Reduced Speed Closing Operation: Provide means to reduce the speed during closing to a maximum of 2.5 foot- pounds kinetic energy. Doors shall close at reduce speed during Firefighter’s Service as required.

H. Nudging Operation & Door Stall Operation: Provide means to sound audible electronic tone when doors are held open for longer than the setting of the Nudging Timer. Doors shall remain fully open if door screen continues to be obstructed. Doors shall fully reopen if door screen becomes obstructed during closing. Provide means to re-open doors in the event that the doors do not close all the way within 30 seconds of closing operation. Provide means to remove the elevator from service after the third unsuccessful attempt.
2.05 ADDITIONAL CONTROL PROVISIONS

A. Nudging Action: If door opening is obstructed for a predetermined adjustable time (20-30 seconds), a buzzer shall sound and attempt to close doors with a maximum of 2½ foot pounds kinetic energy. Allow door to close after obstruction is removed.

B. Differential Door Time: Provide separately adjustable timers to enable varying time that the doors remain open after stopping in response to calls. In response to a car call- adjustable between 1 to 8 seconds; landing call- adjustable between 3-8 seconds. Use landing call timing when responding to coincidental calls.

C. Hoistway Access Switches: An enabling key switch shall be provided in the car operating panel to render all car and hall buttons inoperative and to permit operation of the elevator by means of an access key switch adjacent to the hoistway entrance at the access landing. The movement of the car away from the access landing, other than the lower terminal, by means of the access key switch at the landing shall be limited in travel and direction to that as specified for the upper landing in the latest revision of the ANSI/ASME A-17.1 Code- Section 2.12.

D. Door Zone Restriction Devices: Provide door open restriction devices on all hoistway doors per ANSI/ASME A17.1 Code. Doors will be mechanically restricted from opening unless the elevator car is in the designated unlocking zone. Use solid metal door restrictor device mounted on the car and in the hoistway.

E. Static Type Door Edges: All cars shall have static edges (proximity type) so that upon sensing an obstruction in the entrance, within a range of 5 inches, causes doors to stop and reopen. At manufactures option new door detector devices can be installed as long as they are manufactured by Otis / Janus / Adams or approved equal. Door close shall be arranged to start within a time consistent with ADA requirements from notification that a car is answering a hall call. Doors shall be arranged to remain open for a time period sufficient to meet ADA requirements.

2.06 SIGNAL EQUIPMENT

A. General: Except as otherwise indicated, provide manufacturer’s standard signal equipment for each elevator or group of elevators. Provide new car control station (main only) with new brushed stainless steel faceplate, segment LED matrix car position indicator in each car to replace existing, hall push-button stations to be replaced. Provide illuminated LED buttons and signals, which light-up as activated and remain lighted until call or other function has been fulfilled; fabricate of acrylic or other permanent translucent plastic. Except for buttons, illuminated signal elements, and integral application, fabricate signal equipment with exposed surfaces of stainless steel with manufacturer’s standard directional polish or satin finish. Corridor signals and panels shall be fabricated in a manner such that no additional cutting and patching of corridor walls is required. All fixtures to be vandal proof with stainless steel buttons – Halo LED design.

B. Car Control Stations: Provide new flush-mounted vandal type stainless steel call buttons for each landing served and switches and controls required for specified car operation and control. Car station faceplate is to be mounted flush with new return, main only. All call buttons to be custom designed and LED illuminated. Install new “hands free” telephone system in each elevator cab- Mark other buttons and switches with identification for required use or function. Use manufactures standard fixture or approved supplier. Use white or Blue Halo LED button with stainless steel finish to match existing return finish.

C. Corridor Call Stations: Remove existing elevator push button stations and replace with new, low voltage, fixtures. Re-use existing fixture box and provide oversized fixture plates to accommodate engraved emergency exit pictograph. The new fixtures shall be finished in #4 brushed stainless steel. Incorporate emergency signage on cover plate.

D. Hall Lantern: Replace 2nd floor fixture with new lantern with LED lights. Lanterns shall have a double stroke electronic chime which will sound once for the “UP” direction and twice for the “DOWN” direction as the doors are opening. Provide new slim line surface mounted fixture with brushed stainless steel finish to fully cover existing.

E. Lobby PI: Replace 1st floor lantern with combination lantern and digital Position indicators with new LED 2” Digital PI fixture to cover existing.
F. Audible Signal: A distinctive signal shall sound in the cab to tell a passenger that the car is stopping at the landing where there is egress from the building for the physically handicapped. A floor passing “chime” shall signal as the elevator passes each floor stop.

G. Emergency Signal Bell: A new car emergency signal bell shall be provided of the “monitor type” suitable for outlet box mounting for each elevator. The bell shall be arranged to sound when the emergency button in the car is pressed and also when the alarm button in the car is pressed. The bell shall be mounted in the hoistway at the lower terminal.

H. Emergency Car Lighting: An emergency power unit employing 1 12-volt sealed rechargeable battery and totally static circuits shall be provided that shall illuminate the each elevator car and provide current to the alarm bell in the event of normal power failure. The equipment shall comply with the requirements of the ANSI/ASME Code.

I. Cab fan- Furnish and install a new high speed cab fan with two speed settings.

2.07 SPECIAL DESIGN CRITERIA

A. Design for the handicapped:
2. Locate uppermost button in the cab control panel and the centerline of the telephone handset to be not more than 54 inches above the cab floor.
3. Sound audible soft-tone signal in car when car is stopping or stopped at a floor.
4. Provide hall gongs which sound once for up stops and twice for down stops.
5. In each cab, provide 3/8 inch high Arabic numerals raised .03 inches from the surface and Braille numerals immediately to the left of floor buttons to identify floor.
6. At each floor landing, provide 2 inch high Arabic numerals raised .03 inches from the surface and Braille numerals on each door jamb.

2.08 MATERIALS

A. Rolled steel sections, shapes and rods: ASTM A36.

B. Sheet steel: ASTM A446, Grade B, zinc coated to ASTM A526 G90 coating designation.

C. Stainless steel: ASTM A167, Type 304, No. 4 finish.

D. Aluminum: Anodizing quality, alloy as follows:
1. Extruded material: ASTM B221 6063.
2. Sheet material: ASTM B209 5005.

E. Plywood: APA rated sheathing, 32/16 span rating, Exposure 1, sanded, fire retardant treated.

F. Particleboard: CS 236 high density type, composed of wood chips and waterproof resin binders, of grade to suit the application, with sanded faces.

G. Laminated plastic: NEMA LD-3 of colors, patterns and textures selected.

H. Primers:
2. Plain steel surfaces: Zinc chromate alkyd type.

I. Paint: Semi-gloss alkyd enamel of colors selected.
2.09 DOOR OPERATION AND CONTROLS ALL ELEVATORS

A. All Elevators- Retain recently replaced MAC door operator. This is a new direct current, motor-driven, heavy duty operator, designed to operate the car and hoistway doors simultaneously. All elevator controls shall incorporate “heavy door programming with “closed loop- digital” circuitry” for critical adjustment of door closure at all floors. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure.

B. The leading edge of each leaf of the car door shall be provided with a retractable reversal edge arranged to automatically return car and hoistway doors to the open position in the event the doors are obstructed during closing cycle. Doors will then resume closing cycle. Doors shall automatically open as the car arrives at the landing, and shall automatically close after an adjustable time interval or when the car is dispatched to another landing. Direct drive geared operators, A.C. controlled units with oil checks, or other deviations from the above are not acceptable.

C. Install hoistway door restriction devices and modify doors. Doors will be mechanically restricted from opening unless the elevator car is in the designated unlocking zone. Existing bar type restrictor is acceptable and can be reused.

D. Interlocks install new hoist way door interlocks, pickup roller assemblies, clutches and vanes, springs and keepers. Properly adjust for smooth and trouble free operation. Replace sill mounted closers as needed so that each door is fully self-closing. Replace all relating cables as needed. Replace car gate switches with new. Interlocks shall be tested per ANSI A17.1 code, preventing operation of the elevator until the lock is engaged and the doors are in the closed position. Interlocks shall also prevent the opening of hoistway doors when the elevator is out of the landing zone.

E. Door Hangers and Tracks: Re-use existing hatch door hangers and tracks. Clean surfaces and tighten bolts and related hardware. Provide new polyurethane rollers with ball bearings properly sealed to retain grease as needed.

F. Car Doors – Replace car doors, car door tracks and hangers.

G. Closures: Replace hoistway door closures as needed. Verify all doors are fully self-closing.

2.10 HOISTWAY ENTRANCES

A. Frames and Door Panels: Reuse existing in place- Replace missing non-vision wings and install astragals at all floors where current astragals are missing or damaged.

B. Sills: All elevators- reuse existing in place. Clean and polish.

C. Fascia Plates: All elevators- Reuse existing in place. Stencil floor markings with 4” high lettering.

D. Sight Guard: Remove existing angle type and replace with new black painted toe guards

E. Dust Cover: Reuse existing in place, wire brush and repaint with a rust inhibitive primer and finish coat of enamel paint.

F. Headers: All elevators'- Reuse existing in place. Clean and tighten bolts and other related hardware.

G. Struts: All elevators- Clean and tighten.

H. Hangers: All elevators - Reuse existing hangers and track. Replace rollers as needed with new polyurethane rollers with ball bearings properly sealed to retain grease.

I. Escutcheons: Provide escutcheon tubes where missing and pug any none used keyway access holes
J. Handicapped Jamb Marking: All elevators- Install new Braille jamb marking. Plates shall be applied to both jambs on each entrance and shall have a contrasting background. Plates shall have back background and stainless numbers.

2.11 CAR ENCLOSURES

A. As part of the base bid replace complete cab front including transom, full swing front returns and car doors with new #4 stainless steel finish. Car stations to be integral and flush with new fronts.

B. Remove flooring and replace subflooring and cab threshold.

C. Elevators 1 and 2: Replace the entire cab including cab fronts, transom, walls, hung panels, frieze and reveals and handrail with complete new cab. Hung panels to be plastic laminate and finishes are baked enamel walls and brushed stainless steel finish. Ceiling as described above. Install new T frame ceiling with Lexan panels and LED lighting. Install new rear handrails with stainless steel finish.

PART 3 – EXECUTION

3.01 PREPERATION

A. Inspection:
   1. Verify that hoistway, pit and machine room are ready for work of this Section.
   2. Verify shaft openings are of correct size and within tolerances.
   3. Verify location and size of machine foundation and position of machine foundation bolts.
   4. Confirm electrical power is available and of correct characteristics.
   5. Report deficiencies in writing.

B. Arrange for temporary electrical power to be available for installation work and testing of elevator components.

3.02 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered in the manufacturer’s original, unopened, protective packaging and Contract shall store material in its original protective packaging.

B. The Contractor shall stage all material shipments to coincide with the project schedule and congregate within the Jackson TN area prior to removing the elevator from service for the purpose of modernization.

3.03 INSTALLATION

A. Hoistway & Machine Room Construction: Contractor shall confirm existing dimensions of machinery rooms, hoistway, and pit, prior to fabricating and installing elevator work. Examine all parts of the supporting structure and the conditions under which the elevator work is installed. Clean and tighten all rail bolts and fish plates.

B. Occupied Building: Most of the work outlined in this specification will be performed in an occupied building. Proper measures should be observed in order to minimize the noise and obstruction in public corridors. If drilling of structure or other potential excessive noise is required, the Elevator Contractor shall notify the Designer(s) and obtain permission prior to the commencement of the work. Materials transported from storage areas shall be done so as not to disturb occupants. For any work being performed in the Elevator Lobbies, proper protection must be installed to protect the existing wall and floor finishes.

3.04 DESIGNER’S FIELD INSTRUCTIONS

A. During construction, the Designer will give field instructions as required without invalidating the Contract.

B. Such field instruction shall not be construed as authority to change the terms of the contract.
C. In cases where extra cost or project scope change of the Contract are involved, the Contractor shall notify the Designer at the time of such instructions and shall establish cost difference and receive written approval before proceeding.

D. The Contractor shall not be reimbursed for extra work unless the above procedure has been followed.

3.05 SITE CLEAN UP

A. Contractor shall remove from site, and legally dispose of, all rubbish resulting from the work under his Contract.

B. Contractor shall provide a separate dumpster located on site as directed by the Designer.

C. Rubbish shall be removed daily and not allowed to accumulate or overflow the dumpster.

3.06 SAFETY

A. Elevator Contractor to be responsible for the maintenance of all safety barricades at hoistway openings from the point they start their work until such time as the hoistway doors are adequately and safely installed and operational.

3.07 CLEANING

A. Remove protective coverings from finished surfaces.

B. Clean surfaces and components ready for inspection.

3.08 ADJUSTING

A. Operate elevators and make necessary adjustments to ensure elevators operate smoothly and accurately.

B. Adjust for smooth acceleration and deceleration of car to ensure passenger comfort.

C. Adjust doors to open only at the landing where the car is stopping or at rest. Ensure the opening sequence begins only when the car is at rest.

D. Adjust automatic floor leveling feature at each floor to achieve 1/4 inch from flush

3.09 PROTECTION

A. Protect finished installation under provisions of Section 015000.

B. Locate and protect or lock moveable equipment and controls so they can only be operated by authorized persons.

3.10 ACCEPTANCE & RELIABILITY

A. Copies of all inspection/ acceptance certificates and operating permits, as required by governing authorities to allow normal, unrestricted use of equipment, shall be provided when the elevator is accepted for beneficial use.

B. Any special tools required to perform diagnostic tests or to reprogram elevator systems shall be provided to the Owner either through lease or purchase. Contractor shall agree to update software during and after installation as more current versions are developed that affect Code and safety requirements.

C. For an elevator to be considered “final accepted” by the Designer, it must operate under normal usage continuously for a period of sixty (60) calendar days, with a maximum of two (2) “call-backs” during that period. Time when an elevator is removed for service does not apply under this reliability criteria.

3.11 WARRANTY
A. Warranty shall include 8 hour call back service, correcting operation faults and restoring/replacing defective/ deteriorated components and finishes, lubricating operational units and supplying expendable materials as required for proper operations. Warranty service shall consist of a minimum of 8 hours per week throughout the one year warranty period starting at Substantial Completion.

1. A service log shall be created and prominently posted per Code requirement. The log shall document a) routine inspection, (b) repairs performed, (c) call backs answered and the nature of the call documented, and (d) corrective action. The Contractor shall assign a technician from his service department to be the responsible warranty person and so notify the Designer. The Contractor should not use construction personnel for the upkeep of equipment during construction, however, may use the construction mechanic in charge for emergency repairs or call backs during regular working hours only.

3.12 RELATED WORK NOT INCLUDED IN THE WORK OF THIS SECTION

A. As a part of the elevator modernization there will be some building related work items associated with the elevators to meet modernized code requirements. The following survey conditions were noted and will require attention by the general contractor as a part of a turnkey installation. These items will be included under the general contractor and have been detailed in other sections of the specification but are summarized below.

B. The Elevator Contractor is expected to include in their bid cost associated with coordination work with other trades. This includes a reasonable amount of operator and cab placement in order to facilitate other trades to perform their work.

C. Elevator Related - Includes but is not limited to (Reference Division 28):

1. Coordinate with Fire Alarm Vendor for testing and connection of contact closures.
   a. Elevator lobby, machine rooms, and hoist way / pit smoke detectors, located as required shall be wired from the fire control system to a controller for each group of elevators. A normally closed, potential free (dry) contact rated 120VAC shall be provided for each of the following signals (unless otherwise specified by local code):
      Zone 1 - Each elevator machine room plus an extra contact for fire hat.
      Zone 2 - Designated level. The level at which Fire Dept. enters.
      Zone 3 - The alternate level, which is the next most available level to outside, and all other levels.
   b. Auxiliary contacts is also needed to flash the fire hat.
   c. Smoke detectors shall not be installed in elevator hoistways, unless the top of the hoistway is protected by automatic sprinklers. See NFPA 72; 3-8.14
   d. Move smoke head at 2nd floor to meet required code location. Remove old heat and smoke heads in machine room and locate 1 smoke detector on the new finished ceiling.

2. Provide all necessary electrical work to properly bring modernization up to current ASME and NEC codes. This work includes but is not limited to (Reference Division 26):
   a. The 3 phase (elevator) and single phase (cab Lights) disconnects will need to be disconnected and reconnected by a licensed electrician. New Cab light disconnects will need to be installed. All disconnects are to be fused.
   b. If new electrical disconnects are required then provide. We will need to verify if there is a true ground available. Auxiliary contact is needed. Electrical will be reviewed by electrician prior to bidding.
   c. Sprinklers are not present in the elevator hoistway and/or machine room and as a result shunt trip breakers are not required.
   d. The elevators do not operate off of an emergency power source so the battery lowering feature will be used. As a result the disconnects will need an auxiliary contact to notify the controller in the event power is disconnected at the disconnect.
   e. Provide separate 110 V- A.C. - 15 Amp rated, single phase power supply with DPST fused disconnect switch and feeder wiring to relay panel for elevator signal system or cab lights.
   f. Provide GFI outlets in machine room and pit. Proper lighting in machine room and pits to comply with Code. Add new lights in machine room to meet proper light levels. Provide covers on all retained light fixtures.
   g. Connect all smoke/ heat sensors for zoned arrangement. Provide new contacts and zones and auxiliary contacts to meet new code requirements
h. Install true ground wire on all main and auxiliary disconnect switches.
   i. Replace pit lights with 4 foot moisture proof LED lights.
   j. Pipe the phone line into the new duct work and reconnect

3. Any cutting and patching for hoistway access switches.
4. Filling any holes in hoist way or beveling any ledges greater than 2.5 inches.
6. Pit ladder to extend not less than 48” above the sill of the access door. Rungs shall be 16” wide. The existing ladders should meet the local inspector’s requirements.
7. Provide a proper grate on the sump hole where applicable.
8. A new split system will need to be installed in each elevator machine room. Estimated size will be 1.0 tons. Actual heat output will need to be confirmed with the elevator manufacturer. Preliminary estimates are 8,000 BTU per elevator.
9. Install room partition and new door on elevator 1 machine room Painting of door frames
10. Air conditioning and ventilation of machine room space. Provide room environment to ensure reliable operation of micro-processor equipment with temperature range 60-80 degrees F. with 80% non-condensing humidity. Use existing HVAC source and install new exchanger or install new split system HVAC to maintain a temperature range of 60-80 degrees F. HVAC shall may be located within the bounds of the machine room. Preliminary estimates are 14,000 BTU per elevator.
11. Install fire extinguisher.
12. Provide dedicated phone line at machine room.
13. Equipment room doors must be metal Class B rated doors with closer mechanisms. Doors must be self-closing and self-locking.
14. Water drain line over the controls is a code issue and this should be reviewed by the local inspector- Drain pans may need to be added.
15. Replacement of flooring.

3.13 MISCELLANEOUS WORK INCLUDED IN THE WORK OF THIS SECTION

A. Custom Temporary enclosures or other protection from open hoistways (corridor barricades).

B. Connect smoke devices to elevator controllers and testing (on overtime).

C. Paint all machine room floors and existing machines after installation.

D. Paint all pit floors and car tops.

E. Install pit ladders or modify existing ladders to comply with current requirements.

F. Furnish and Install cab phones.

END OF SECTION
SECTION 142280

HYDRAULIC FREIGHT ELEVATOR MODIFICATIONS – TENNESSEE TOWER

PART 1  GENERAL

1.01  DESCRIPTION OF WORK

A. Furnish and install all materials, programming and labor necessary for the elevator modernization herein specified.

B. It is the intention of these specifications to call for finished work, completely tested and ready for the Owner’s operation.

1.02  RELATED DOCUMENTS

A. Section 089120: Louvers to vent shaft.

B. Sections 092116: Cavity shaft walls.

C. Section 096500: Resilient flooring in cabs with installation specified herein.

D. Section 099000: Finish painting of hoistway doors and frames.

E. Section 260519: Electrical power supplies.

1.03  SUBMITTALS

A. Submit items under provisions of Section 013000.

B. Shop Drawings and Product Data
   1. Product Data: Submit manufacturer’s technical product data and installation instructions for each principal component or product, and include certified test reports on required testing. List and describe features of control system, performances and operating characteristics.
   2. Shop drawings: Illustrating general arrangement and loads of elevator equipment, plans and other details shall be provided. Shop drawing approval must be obtained before proceeding with the fabrication and installation of components. Upon completion of the work, delivery to the Designer, two complete “as installed/ built” sets of wiring diagrams covering the products installed. The above documentation shall become the sole property of the Owner.
   3. Samples: Submit fixture samples; cover plates, buttons and hall lantern lens samples (as required by the specification).
   4. Maintenance Manuals: Three (3) bound manuals shall be provided for each group of elevators or those of similar design and duty, with operating and maintenance instructions, parts listing, recommended parts inventory listing, purchase source listing for major and critical components, emergency instructions, and similar information.
   5. Diagnostic Tools and Proprietary Information: Make available to the Owner the option to lease or purchase any diagnostic “hand held” devices that apply to the elevator systems installed herein. Software upgrades shall be offered to the Owner on an annual basis as a condition of lease/ or purchase. Bidders are requested to identify specifically any information contained in their bids which they consider confidential and/ or proprietary and which they believe to be exempt from disclosure citing specifically the applicable exempting law.
   6. Contractor shall submit a minimum of five (5) copies of shop drawings for the Designer’s review. Before commencing any work or providing materials, all drawings relating to arrangement or disposition of such work shall be approved by the Designer.
   7. The Designer checking and review of Contractor’s and sub-contractor’s drawings or equipment details does not relieve the Contractor from responsibility for errors, omissions, or equipment characteristics furnished in accordance with such checked or reviewed drawings.
8. By checking the Contractor’s and sub-contractor’s drawings or equipment details the Designer does not thereby assume responsibility for errors or omissions. Where such errors or omissions are discovered later, they shall be made good by the Contractor irrespective of any review by the Designer.
9. Upon completion of the contract work, the Contractor shall provide full size electrical wiring diagrams as well as electronic (pdf) files.
10. All labor and material costs incurred in the accomplishment of the foregoing requirements shall be borne by the Contractor. Final approval of the work and final payments shall be withheld until receipt of the tracings and prints.

C. Submit product data on the following items:
1. Signal and operating fixtures, operating panels and indicators.
2. Cab design and components.
3. Electronic equipment to control and monitor elevator control functions.
4. Two-way communications equipment and signage, data plates and other identification devices required by ANSI A17.1.

D. Submit two 4 x 4 inch minimum size samples of materials and finishes required for cab interior, cab ceiling, cab doors, operating and signal system fixtures and finish of hoistway doors and frames. Provide finish samples to be actual finishes on base material to which it is to be installed.

1.04 QUALITY ASSURANCE

A. Manufacture and Install per Industry Standards
2. Comply with applicable code sections related to the latest adopted edition for the State of Tennessee and Shelby County.
3. Comply with applicable NFPA Codes and specifically with the section relating to electrical work and elevators.
4. Comply with Title III of the American with Disability Act. Design the elevators to comply with requirements for the handicapped, including clearances, handrails, locations of signal equipment, and similar provisions.
5. Comply with applicable sections of the National Electric Code relating to electrical work and elevators.
6. Comply with applicable sections of the BOCA and/or Standard Building Codes relating to elevators.
7. Meet requirements and provide labels (UL and NEC) for electrical equipment and materials wherever standards have been established and label services are regularly furnished by.

B. Manufacturer: Company specializing in manufacturing elevator equipment with 15 years of documented experience.

C. Installer: Employees and supervisor on payroll of the elevator manufacturer or a licensed franchisee of the elevator manufacturer.

D. Comply with ANSI A17.1 and ANSI C2 and as supplemented in this Section.

E. Door and frame assemblies: Comply with NFPA 80 and UL 10B.

F. Welding: Comply with AWS D1.1.

1.05 SUBSTITUTIONS

A. Product Substitution - Certain manufactured articles specified herein are mentioned under one or more trade or manufacturer’s names. These manufactured articles, as specified, shall form the basis of the contractor’s bid. Additional products will be permitted by addendum only.
1. Articles of other manufacturers, of equivalent design, quality and capacity, as adjudged by the Consultant, will be considered no later than ten (10) working days prior to bid date. Establishing proof of the equality of the product to that specified shall be the responsibility of the bidder. Determination of equality of all products is
vested in the Consultant, whose decision shall be final and binding upon all concerned. No substitutions will be allowed after the Contract is awarded.

2. Where a Contractor proposes to use an item of equipment other than that specified or detailed in the specification that requires any re-design of any other part of the mechanical, electrical or architectural layout, all such re-design and all new drawings required therefore shall be prepared by the Contractor, at his own expense. And, should this re-design require additional cost to other Contractors, this expense shall be borne by the contractor making such changes. All changes shall be approved by the Owner.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 017821.

B. Include description of the elevator system’s method of operation and control including group supervisory control system, motor control system, door operation, signals, special service provisions, emergency power operation, and special or non-standard features provided.

C. Provide parts catalog with a complete list of equipment replacement parts, with equipment description and identifying numbers.

D. Provide a legible schematic of wiring diagrams covering electrical equipment installed, including changes made in the accepted work of this Section, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.

E. Provide one copy each of the following items behind plastic or glass glazing, in a metal frames, mounted adjacent to each other on a machine room wall in a location which is readily accessible for reference.
   1. Master electrical schematic.
   2. Lubrication chart.

1.07 MAINTENANCE MATERIALS

A. Provide one set of the programming tools and testing equipment required for reprogramming and testing of the elevator controller.

1.08 PREINSTALLATION CONFERENCE

A. Convene a pre-installation conference at least one week prior to commencing work of this Section.

B. Require attendance of persons directly involved with the work of this Section.

C. Review schedule of installation, installation procedures and conditions, and coordination with related work.

D. Review temporary use of cab designated for temporary use, including hours of use, scheduling of its use, cleanliness of cab, employment of operator, and maintenance of system.

1.09 WARRANTY

A. Provide a one year manufacturer’s warranty under provisions of Section 017821, commencing at the date of Final Completion of the Project.

B. Include coverage of the elevator system controller and operating equipment and devices.

1.10 TESTS

A. Provide inspection and testing of elevator system.

B. Obtain and pay for municipal and state permits and inspections required.
C. Conduct tests required by governmental agencies.

D. Schedule tests so that the authority having jurisdiction, the Designer, the Owner and the Contractor are all present during tests.

1.11 DELIVERY, STORAGE AND HANDLING

A. Deliver items to the site and handle, store and protect under provisions of Section 016000.
   1. Do not deliver materials until the areas in which they are to be installed are ready to receive them.
   2. Fully protect movable and operating equipment from the weather.
   3. Ensure that factory finishes are wrapped and crated to protect from damage.

B. Materials shall be delivered in the manufacturer’s original, unopened, protective packaging and Contract shall store material in its original protective packaging.

C. The Contractor shall stage all material shipments to coincide with the project schedule and congregate within the Nashville, TN area prior to removing the elevator from service for the purpose of modernization.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Otis Elevator.

B. Schindler Elevator Corp.

C. Thyssen Elevator.

D. Kone Elevator.

2.02 EQUIPMENT SUMMARY

<table>
<thead>
<tr>
<th>Type</th>
<th>Hydraulic Freight– In Ground</th>
</tr>
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<tr>
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<td>Dover</td>
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<tr>
<td>Machine</td>
<td>Dry Power Units with Pump/Motor Stand</td>
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<tr>
<td>Type Door Operator</td>
<td>Courion Power Door Operator</td>
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<tr>
<td>Date of Installation</td>
<td>1966 – Control and door update 1999</td>
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2.03 COMMON HYDRAULIC ELEVATOR ELEMENTS

A. Power Unit – Provide a new “dry type” power unit assembly consisting of an oil tank, a motor, pump, oil control valve and suction line strainer. The “dry type” drive assembly should consist of a directly coupled pump and motor isolated with rubber vibration mounts. The pump shall be of positive displacement screw type, designed for steady discharge with minimum pulsation. The motor used shall be of 80/120 starts per hour at 130% nominal horsepower in 158°F. oil. A bimetallic thermal protection to prevent system damage from overheating due to phase reversal or loss shall be provided. A control valve shall regulate the flow of oil between the power unit and the jack. Advise if HP size is larger than existing.
   1. The valve shall contain, in one unit, up and down valves, two-way leveling, relief and check functions, all of which are controlled by four solenoid valves. A screen type suction line strainer shall be located at the suction
line to the pump to keep foreign material that might be present in the oil from making its way into the pump. A muffler shall be installed to replace the existing (within the oil line piping) to provide reduction in noise transmission to the car caused by oil pulsations that originate in the pump unit. Provide steel pipe of the proper size for the power unit, grooved fittings and a shut off valve. Provide an oil tank of oblong “V” bottom sheet steel designed to store the pumping equipment and oil. Pump motor shall be an A.C. Poly-phase, 1800 RPM, 480 Volt, 3 Phase- 60 Hertz, open drip-proof frame. Insulation to be Class B, 90 degree Celsius temperature rise from 40 degrees Celsius ambient. A phase monitor relay shall be provided.

B. Micro Processor Controller- Provide a new Microprocessor Controller system consisting of three (3) function modules; power module, car station floor controller boards, and hallway floor controller boards. Provide separate door controller cabinet.

C. Operation: Opening is to be automatic upon car arrival or in response to momentary pressure push button. Closing is to be by momentary pressure push button. An audible alarm must sound five seconds prior to the start of closing and during the closing cycle, as well as “sequence” closing. Release of push button while doors are closing will cause doors to stop and reopen.

D. Other Controller Features- Elevators shall not require the functioning or presence of the microprocessor to operate on car top inspection to provide a reliable means of moving the car if the microprocessor fails. A motor limit timer function shall be provided which, in case of the pump motor being energized longer than a predetermined time, shall cause the car to descent to the lowest landing and park, open the doors automatically and then close them. Car calls shall be canceled and the car taken out of service automatically. Operation may be restored by cycling the main line disconnect switch or putting the car on inspection operation. Door reopening devices shall remain operative. A selector switch shall be provided on the controller to select high or low speed during inspection operation. The controller shall include absolute floor encoding, which upon power up, shall move the car to the closest floor to identify the position of the elevator.

E. Soft start line starter- Provide electronic “soft start” line starter device to reduce initial starting current.

F. Leveling control- Existing mechanical leveling devices shall be removed and replaced with a new digital feedback system integrated with the new microprocessor system and drive.

G. Jack Unit Assembly- Reuse/ retain existing jack unit assembly. Sand cylinder surface with light emery, provide new cylinder seals and pressure test units for leaks under full load conditions. Check for plumb, review and make necessary repairs or adjustments.

H. Piping & Victaulic- Reuse existing overhead oil lines and replace existing couplers with new as needed. If building was built to seismic requirements then include rupture valve. Paint all pipe to match new equipment. Replace all Victaulic seals. Oil Coolers- are not required on this project.

I. Independent Service- A switch shall be provided in the car operating station of each elevator which, when actuated, shall disconnect the elevator from hall buttons and permit operation from the car buttons only. If the car is on independent service mode when elevators are recalled by means of SES, a buzzer shall sound in the elevator and a jewel shall be illuminated as required by ANSI Rule 2.27.3.

J. Emergency Fire Fighting Operation- Provide operation as described in next section.

K. Guide Rails & Guide Assemblies- Thoroughly clean all guide rails of grease, oil and other foreign substances. Refurbish slide guides with nylon inserts. If current guide does not provide sufficient support then replace with larger size guide. The shank and based of the T-section of existing guide rails shall be thoroughly de-greased and painted one field coat of black metal enamel

L. Fascia & Toe Guards- Reuse existing hoistway fascia plates- clean, paint with rust inhibitive primer, and tighten. Properly mark to identify hoistway with numerals representative of floor landings. Provide extended toe guard as required by code and permitted with existing pit up to 24”
M. **Wiring:** Provide new machinery room and hoistway wiring. All wiring and electrical interconnections shall comply with the governing Codes. Insulated wiring shall have flame retardant and moisture proof outer covering, and shall be suspended to relieve strain on individual conductors. Traveling cables shall be capable of handling a minimum of 10 percent spare conductors and contain 6 pairs of shielded wire.

N. **Automatic Self-Leveling:** The elevator shall be provided with a two-way, self-leveling feature that will automatically bring the car to the floor landings. This self-leveling shall, within its zone, be entirely automatic and independent of the operating device and shall correct for over-travel or under-travel within 1/2" of floor levels. The car shall also be maintained level with the landing irrespective of the load.

O. **Pit Switch:** A new emergency stop switch shall be located in the pit accessible from the pit ladder and at required height.

P. **Buffers:** Reuse existing buffers. Clean and paint. Buffers shall comply with ANSI A-17.1 Code requirements. Pit floor shall also be painted.

Q. **Car Top Inspection Station:** Provide a new car top inspection station with an “emergency stop” switch and with constant pressure “up-down” direction buttons. The device shall make the normal operating devices inoperative and give the inspector complete control of the elevator. Include new car top railing if space between cab wall and hoistway exceed 18”.

R. **Emergency Fire Fighting Operation:**
   1. Provide an emergency operation system for use by firefighting or rescue personnel as specified by ANSI A17.1-current edition, Section 2.27. Switches shall be clearly identified as to function and shall be arranged and designed to prevent unauthorized use or accidental operation being placed behind locked cabinet within the car operating panel as described in 2.27.3.7.
   2. Provide keyed switches in panel at the Lobby floor for each elevator in accordance with ANSI A17.1-current edition, Section 2.27. Provide SES (Safety Emergency Phase I & II).

S. **Special Emergency Service Phase I:** Emergency operation to return the elevator to the Lobby floor level by means of a key operated switch at the lobby shall be provided in compliance with Code. The key switch shall be mounted integral with new corridor call cover plates- see fixture & signal section.

T. **Special Emergency Service Phase II:** Within elevator controls of each elevator during the emergency operation, a key switch shall be provided to allow independent use of the elevator by emergency or rescue personnel. Operation as specified by ANSI A-17.1, 2010 or current edition, Section 2.27 shall apply to its operation. Auxiliary contacts in the elevator control panel shall be available for interfacing with the building alarm system.

U. **Elevator capture smoke/ heat devices, and their required power supply, to be zoned as follows; Lobby, typical elevator landing corridors, and machine room. Provide auxiliary modules to flash fire hat in car and at main lobby egress.**

2.04 **PERFORMANCE STANDARDS:**

A. **Speed:** +/- 3 % of contract speed under any loading condition.

B. **Capacity:** Safely lower, stop and hold up to 125 % of rated load.

C. **Stopping Accuracy:** +/- 1/8- 1/4" under any loading condition.

D. **Force Limiting Operation:** Provide means to limit the door pressure while closing to a maximum or 30 pounds (measured from rest) and a maximum of 7.5 foot- pounds kinetic energy. Provide means to reduce the force exerted on the doors during a stall condition.
2.05 ADDITIONAL CONTROL PROVISIONS

A. Hoistway Access Switches: An enabling key switch shall be provided in the car operating panel to render all car and hall buttons inoperative and to permit operation of the elevator by means of an access key switch adjacent to the hoistway entrance at the access landing. The movement of the car away from the access landing, other than the lower terminal, by means of the access key switch at the landing shall be limited in travel and direction to that as specified for the upper landing in the latest revision of the ANSI/ASME A-17.1 Code- Section 2.12.

B. Bi-Parting Freight Doors: Retain existing power operated doors. Panels shall be repainted to match existing color. Lower edge of upper panel shall have a fire resistive non-shearing, non-crushing meeting edge to close distance between rigid door sections that must be maintained at not less than ¾”. Do not panels must comply with the latest version of ASME A17.1 and local codes and bear a 1 ½ hour UL (B) label. Refurnish door tracks as needed. Tracks shall be minimum # 7 gauge formed steel fastened to existing entrance jams. Door stops to transmit panel sill loads to the building sill structure. Replace panel guide shoes. – Shoes shall have milled grooves and be adjustable, ductile iron and completely replaceable. Nylon or other composite material guide shoes with or without sheet metal shell are not permissible.

C. Vertical Lift Car Gate: Replace existing car gates with new gates. Gate panel shall be 6’0” high # 10 gauge woven steel wire with structural steel frame and reinforcing. Panel to slide vertically to open on steel tracks. Panel guide shoes shall have milled grooves and be adjustable, ductile iron and completely replaceable. Nylon or other composite material guide shoes with or without sheet metal shell are permissible. Panels to be hung on steel roller chain and fully counterweighted for ease of operation. Each chain is to be individually adjustable for length at connection to car gate panel. Provide reopening device which causes gate to stop and reopen if it should meet with an obstruction while closing, as well as sequence gate and door operation. Provide new light sensing device coupled to the car gate providing additional protection.

D. Door Control: Retain door control panel that provides the opening and closing of doors and gates as well as a retiring cam operation, reopening device function and sequence operation. Control shall monitor the position of doors and gates at all times without the use of door & gate limit switches. Deceleration points shall be automatically adjusted by control so that final open and final closed positions are reached smoothly without shock or jarring of doors or gate and without stopping “short” of fully open or closed position and then restarting. Initial setting and adjusting of full open and closed positions shall be established through operation of ‘open’, ‘close’, and ‘stop’ push buttons inside car. Opening and closing speeds for doors & gate are to be independently and fully adjustable to allow any closing speed up to A17.1/B44 Code maximums.

E. Control shall be automatically operational upon application of power. After automatic safety shut down, control shall restart upon pressing ‘Door Stop’ push button in the car. ‘Constant pressure close’, ‘Momentary pressure close’ or ‘Timed Automatic’ closing shall be field selectable. Controller is to be completely front wired, to have clear slight line to terminal strips for field connections and mounted in NEMA 1 cabinet with hinged swing door. Retiring cam operation is to be silent, without bounce and without the use of dampering devices. Cam ‘drip’ is to be powered down with cam motor not by gravity alone. All control components are to be commercially available and nonexclusive to control supplier. Control assembly to bear label or approved testing facility such as Underwriters Laboratory. Doors and door controls shall be manufactured by EMS Group, Inc., St. Louis, Missouri or approved equal.

2.06 SIGNAL EQUIPMENT all elevators

A. General: Except as otherwise indicated, provide manufacturer’s standard signal equipment for each elevator or group of elevators. Provide new car control station (main only) with new brushed stainless steel faceplate, segment LED matrix car position indicator in each car to replace existing, hall push-button stations to be replaced. Provide illuminated LED buttons and signals, which light-up as activated and remain lighted until call or other function has been fulfilled; fabricate of acrylic or other permanent translucent plastic. Except for buttons, illuminated signal elements, and integral application, fabricate signal equipment with exposed surfaces of stainless steel with manufacturer’s standard directional polish or satin finish. Corridor signals and panels shall be fabricated in a manner such that no additional cutting and patching of corridor walls is required. All fixtures to be vandal proof with stainless steel buttons and LED light.
B. Car Control Stations: Provide new main car operating panels. Provide a stainless faceplate with #4 brushed stainless steel finish and vandal resistant buttons and controls. Include all ADA requirements and operational switches; Phase II, car light and fan and independent operation. Provide a door “hold open” button on the front opening panel that when activated will hold the elevator at a designated floor landing until a new car call is activated.

C. Hall Control Stations: Hall door control buttons shall be vandal resistant ‘door open’, ‘door close’ and ‘stop’ button for control of the power operated doors. Provide buttons that are integral with the hall call station. Pushbuttons and fixture plate shall match those specified for the car operating panel. Provide SES switch at the dock entrance integral with the push button station designed to activate Phase I fire operations.

D. Handicapped Jamb Marking: Jamb marking plates, with raised floor markings to identify each landing, shall be applied to entrance jambs. Braille and markings per California Code requirements.

E. Emergency Signal Bell: A new car emergency signal bell shall be provided of the “monitor type” suitable for outlet box mounting for each elevator. The bell shall be arranged to sound when the emergency button in the car is pressed and also when the alarm button in the car is pressed. The bell shall be mounted in the hoistway at the lower terminal.

F. Emergency Car Lighting: An emergency power unit employing 1 12-volt sealed rechargeable battery and totally static circuits shall be provided that shall illuminate the each elevator car and provide current to the alarm bell in the event of normal power failure. The equipment shall comply with the requirements of the ANSI/ASME Code.

G. Cab fan- Furnish and install a new high speed cab fan with two speed settings.

2.07 SPECIAL DESIGN CRITERIA

A. Design for the handicapped:
   1. Comply with ANSI A117.1 and with applicable requirements of the Americans with Disabilities Act.
   2. Locate uppermost button in the cab control panel and the centerline of the telephone handset to be not more than 54 inches above the cab floor.
   3. Sound audible soft-tone signal in car when car is stopping or stopped at a floor.
   4. Provide hall gongs which sound once for up stops and twice for down stops.
   5. In each cab, provide 7/8 inch high Arabic numerals raised .03 inches from the surface and Braille numerals immediately to the left of floor buttons to identify floor.
   6. At each floor landing, provide 2 inch high Arabic numerals raised .03 inches from the surface and Braille numerals on each door jamb

2.08 MATERIALS

A. Rolled steel sections, shapes and rods: ASTM A36.

B. Sheet steel: ASTM A446, Grade B, zinc coated to ASTM A526 G90 coating designation.

C. Stainless steel: ASTM A167, Type 304, No. 4 finish.

D. Aluminum: Anodizing quality, alloy as follows:
   1. Extruded material: ASTM B221 6063.
   2. Sheet material: ASTM B209 5005.

E. Plywood: APA rated sheathing, 32/16 span rating, Exposure 1, sanded, fire retardant treated.

F. Particleboard: CS 236 high density type, composed of wood chips and waterproof resin binders, of grade to suit the application, with sanded faces.

G. Galvanized surfaces: Zinc dust/oxide type.
H. Plain steel surfaces: Zinc chromate alkyd type.
I. Wood surfaces: Alkyd primer sealer.
J. Paint: Semi-gloss alkyd enamel of colors selected.

2.09 DOOR OPERATION AND CONTROLS ALL ELEVATORS

A. All Elevators- Retain Courion door operator and control and incorporate into new car controller.
B. Bi-Parting Freight Doors: Retain existing and adjust door tracks and guides as needed to maintain proper operation.
C. Vertical Lift Car Gate: Provide new car door gate as detailed above
D. Door Panel and Gate Finish: Each surface (except sliding surfaces of door and gate tracks) to receive one heavy coat of factory applied corrosion resistant primer and one field applied coat of baked enamel paint.
E. Interlocks Retain hoist way door interlocks, pickup roller assemblies, clutches and vanes, springs and keepers. Properly adjust for smooth and trouble free operation. Replace car gate switches with new. Interlocks shall be tested per ANSI A17.1 code, preventing operation of the elevator until the lock is engaged and the doors are in the closed position. Interlocks shall also prevent the opening of hoistway doors when the elevator is out of the landing zone.
F. Door Hangers and Tracks: Re-use existing door hangers and tracks. Clean surfaces and tighten bolts and related hardware. Provide new polyurethane guides as needed.

2.10 HOISTWAY ENTRANCES

A. Frames and Door Panels: Reuse existing in place
B. Sills: All elevators- reuse existing in place.
C. Fascia Plates: All elevators- Reuse existing in place. Stencil floor markings with 4” high lettering.
D. Dust Cover: Reuse existing in place, wire brush and repaint with a rust inhibitive primer and finish coat of enamel paint.
E. Headers: All elevators’- Reuse existing in place. Clean and tighten bolts and other related hardware.
F. Handicapped Jamb Marking: All elevators- Install new Braille jamb marking. Plates shall be applied to both jambs on each entrance and shall have a contrasting background. Plates shall have back background and stainless numbers.

2.11 CAR ENCLOSURES

A. Reuse existing platform, stiles, sling, bolster, jack cylinder, buffers and pit channels. Retain existing cab walls, ceiling and sub-floor.
   1. Install new double row of 2” X 12” oak bumpers on the side walls. Mount bottom row at floor level and the top row at 36” above the floor.
   2. Install new diamond plate flooring.
   3. Paint cab interior walls and ceiling with a baked enamel paint finish- color selected by Owner.
   4. Paint car bottom, top and pit buffers and channels after cleaning and de-greasing surfaces with a non-corrosive enamel paint.
   5. Replace existing lighting fixtures and cab fan with new flush recessed mounting.
PART 3 – EXECUTION

3.01 PREPARATION

A. Inspection:
   1. Verify that hoistway, pit and machine room are ready for work of this Section.
   2. Verify shaft openings are of correct size and within tolerances.
   3. Verify location and size of machine foundation and position of machine foundation bolts.
   4. Confirm electrical power is available and of correct characteristics.
   5. Report deficiencies in writing.

B. Arrange for temporary electrical power to be available for installation work and testing of elevator components.

3.02 INSTALLATION

A. Hoistway & Machine Room Construction: Contractor shall confirm existing dimensions of machinery rooms, hoistway, and pit, prior to fabricating and installing elevator work. Examine all parts of the supporting structure and the conditions under which the elevator work is installed. Clean and tighten all rail bolts and fish plates.

B. Occupied Building: Most of the work outlined in this specification will be performed in an occupied building. Proper measures should be observed in order to minimize the noise and obstruction in public corridors. If drilling of structure or other potential excessive noise is required, notify the Designer and obtain permission prior to the commencement of the work. Materials transported from storage areas shall be done so as not to disturb occupants. For any work being performed in the Elevator Lobbies, proper protection must be installed to protect the existing wall and floor finishes.

3.03 DESIGNER FIELD INSTRUCTIONS

A. During construction, the Designer and the Designer’s consultants will observe the work and give field instructions as required without invalidating the Contract.

B. Such field instruction shall not be construed as authority to change the terms of the contract.

C. In cases where extra cost or project scope change of the Contract are involved, the Contractor shall notify the Designer at the time of such instructions and shall establish cost difference and receive written approval before proceeding.

D. The Contractor shall not be reimbursed for extra work unless the above procedure has been followed.

3.04 SITE CLEAN UP

A. Contractor shall remove from site, and legally dispose of, all rubbish resulting from the work under his Contract.

B. Contractor shall provide a separate dumpster located on site. Have location approved by the Owner.

C. Rubbish shall be removed daily and not allowed to accumulate or overflow the dumpster.

3.05 SAFETY

A. Contractor to be responsible for the maintenance of all safety barricades at hoistway openings from the point they start their work until such time as the hoistway doors are adequately and safely installed and operational.

3.06 CLEANING

A. Remove protective coverings from finished surfaces.
B. Clean surfaces and components ready for inspection.

3.07 ADJUSTING
A. Operate elevators and make necessary adjustments to ensure elevators operate smoothly and accurately.
B. Adjust for smooth acceleration and deceleration of car to ensure passenger comfort.
C. Adjust doors to open only at the landing where the car is stopping or at rest. Ensure the opening sequence begins only when the car is at rest.
D. Adjust automatic floor leveling feature at each floor to achieve 1/4 inch from flush

3.08 PROTECTION
A. Protect finished installation.
B. Locate and protect or lock moveable equipment and controls so they can only be operated by authorized persons.

3.09 ACCEPTANCE & RELIABILITY
A. Copies of all inspection/acceptance certificates and operating permits, as required by governing authorities to allow normal, unrestricted use of equipment, shall be provided when the elevator is accepted for beneficial use.
B. Any special tools required to perform diagnostic tests or to reprogram elevator systems shall be provided to the Owner either through lease or purchase. Contractor shall agree to update software during and after installation as more current versions are developed that affect Code and safety requirements.
C. For an elevator to be considered “final accepted” by the Designer, it must operate under normal usage continuously for a period of sixty (60) calendar days, with a maximum of two (2) “call-backs” during that period. Time when an elevator is removed for service does not apply under this reliability criteria.

3.10 WARRANTY
A. Warranty shall include 8 hour call back service, correcting operation faults and restoring/replacing defective/deteriorated components and finishes, lubricating operational units and supplying expendable materials as required for proper operations. Warranty service shall consist of a minimum of 8 hours per week throughout the one year warranty period starting at Substantial Completion.
   1. A service log shall be created and prominently posted per Code requirement. The log shall document a) routine inspection, (b) repairs performed, (c) call backs answered and the nature of the call documented, and (d) corrective action. The Contractor shall assign a technician from his service department to be the responsible warranty person and so notify the Designer. The Contractor should not use construction personnel for the upkeep of equipment during construction, however, may use the construction mechanic in charge for emergency repairs or call backs during regular working hours only.

3.11 RELATED WORK NOT INCLUDED IN THE WORK OF THIS SECTION
A. As a part of the elevator modernization there will be some building related work items associated with the elevators to meet modernized code requirements. The following survey conditions were noted and will require attention by the general contractor as a part of a turnkey installation. These items will be included under the general contractor and have been detailed in other sections of the specification but are summarized below.
B. As part of the scope of this Section include coordination work with other trades. This includes a reasonable amount of operator and cab placement in order to facilitate other trades to perform their work.
C. Elevator Related - Includes but is not limited to:
   1. Coordinate with Fire Alarm Vendor for testing and connection of contact closures.
   2. Elevator lobby, machine rooms, and hoist way/pit smoke detectors, located as required shall be wired from the fire control system to a controller for each group of elevators. A normally closed, potential free (dry) contact rated 120VAC shall be provided for each of the following signals (unless otherwise specified by local code):
      a. Zone 1 - Each elevator machine room plus an extra contact for fire hat.
      b. Zone 2 - Designated level. The level at which Fire Dept. enters.
      c. Zone 3 - The alternate level, which is the next most available level to outside, and all other levels.
      d. Auxiliary contacts is also needed to flash the fire hat.
      e. Smoke detectors shall not be installed in elevator hoistways, unless the top of the hoistway is protected by automatic sprinklers. See NFPA 72; 3-8.14
      f. Move smoke head at 2nd floor to meet required code location. Remove old heat and smoke heads in machine room and locate 1 smoke detector on the new finished ceiling.
   3. Provide all necessary electrical work to properly bring modernization up to current ASME and NEC codes. This work includes but is not limited to:
      a. The 3 phase (elevator) and single phase (cab Lights) disconnects will need to be disconnected and reconnected by a licensed electrician. New Cab light disconnects will need to be installed. All disconnects are to be fused.
      b. If new electrical disconnects are required then provide. We will need to verify if there is a true ground available. Auxiliary contact is needed. Electrical will be reviewed by electrician prior to bidding.
      c. Sprinklers are not present in the elevator hoistway and/or machine room and as a result shunt trip breakers are not required.
      d. The elevators do not operate off of an emergency power source so the battery lowering feature will be used. As a result the disconnects will need an auxiliary contact to notify the controller in the event power is disconnected at the disconnect.
      e. Provide separate 110 V- A.C. - 15 Amp rated, single phase power supply with DPST fused disconnect switch and feeder wiring to relay panel for elevator signal system or cab lights.
      f. Provide GFI outlets in machine room and pit. Proper lighting in machine room and pits to comply with Code. Add new lights in machine room to meet proper light levels. Provide covers on all retained light fixtures.
      g. Connect all smoke/heat sensors for zoned arrangement. Provide new contacts and zones and auxiliary contacts to meet new code requirements
      h. Install true ground wire on all main and auxiliary disconnect switches.
      i. Replace pit lights with 4 foot moisture proof LED lights.
      j. Pipe the phone line into the new duct work and reconnect
   4. Any cutting and patching for hoistway access switches.
   5. Filling any holes in hoist way or beveling any ledges greater than 2.5 inches.
   7. Pit ladder to extend not less than 48” above the sill of the access door. Rungs shall be 16” wide. The existing ladders should meet the local inspector’s requirements.
   8. Provide a proper grate on the sump hole where applicable.
   9. A new split system will need to be installed in elevator machine room. Estimated size will be 1.0 tons. Actual heat output will need to be confirmed with the elevator manufacturer. Preliminary estimates are 8,000 BTU per elevator.
   10. Air conditioning and ventilation of machine room space. Provide room environment to ensure reliable operation of micro-processor equipment with temperature range 60-80 degrees F. with 80% non- condensing humidity. Use existing HVAC source and install new exchanger or Install new split system HVAC to maintain a temperature range of 60-80 degrees F. HVAC shall may be located within the bounds of the machine room. Preliminary estimates are 14,000 BTU per elevator.
   11. Install fire extinguisher
   12. Provide dedicated phone line at machine room
   13. Equipment room doors must be metal Class B rated doors with closer mechanisms. Doors must be self-closing and self-locking.
   14. Water drain line over the controls is a code issue and this should be reviewed by the local inspector- Drain pans may need to be added
   15. Replacement of carpet / flooring
3.12 MISCELLANEOUS WORK INCLUDED IN THE WORK OF THIS SECTION

A. Custom Temporary enclosures or other protection from open hoistways (corridor barricades).
B. Connect smoke devices to elevator controllers and testing (on overtime).
C. Paint all machine room floors and existing machines after installation.
D. Paint all pit floors and car tops.
E. Install pit ladders or modify existing ladders to comply with current requirements.
F. Furnish and Install cab phones.

END OF SECTION
SECTION 145000

SCISSOR DOCK LIFT – TENNESSEE TOWER

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish and install all materials, programming and labor necessary for the Scissor Dock Lift herein specified.

B. Removal and disposal of old Trepel lift.

C. It is the intention of the Contract Documents to call for finished work, completely tested and ready for the Owner’s operation.

1.02 RELATED DOCUMENTS

A. Section 055000: Metal angles for edge perimeter of dock.

B. Section 260519: Electrical power supplies.

1.03 SUBMITTALS

A. Submit items under provisions of Section 013000.

B. Maintenance Data: Submit manufacturer’s recommended preventative maintenance and service information.

C. Operating Manuals: Supply operation, Installation and maintenance manuals pertaining to the equipment.

D. Shop Drawings and Product Data:
   1. Product Data: Submit manufacturer’s technical product data and installation instructions for each principal component or product, and include certified test reports on required testing. List and describe features of control system, performances and operating characteristics.
   2. Shop Drawings: Submit drawings indicating fabrication and assembly of dock equipment including plans, elevations, and details.
   3. The Designer checking and review of Contractor’s and sub-contractor’s drawings or equipment details does not relieve the Contractor from responsibility for errors, omissions, or equipment characteristics furnished in accordance with such checked or reviewed drawings.
   4. The checking of Contractor’s and sub-contractor’s drawings or equipment details by the Designer does not give or transfer any responsibility to the Designer for errors or omissions. Where such errors or omissions are discovered later, they shall be made good by the Contractor irrespective of any review by the Designer.

E. Upon completion of the contract work, the Contractor shall provide full size electrical wiring diagrams as well as electronic (pdf) files.

F. All labor and material costs incurred in the accomplishment of the foregoing requirements shall be borne by the Contractor. Final approval of the work and final payments shall be withheld until receipt of the tracings and prints.

G. Submit two 4 x 4 inch minimum size samples of materials and finishes required for cab interior, cab ceiling, cab doors, operating and signal system fixtures and finish of hoistway doors and frames. Provide finish samples to be actual finishes on base material to which it is to be installed.

1.04 QUALITY ASSURANCE

A. Manufacture and Install per Industry Standards.

C. Electrical: All electrical components and the entire controller assembly shall be Underwriters Laboratory listed.

D. Structural Rigidity: The scissor leg assembly shall be of structural steel plate for maximum rigidity.

E. Manufacturer: Company specializing in manufacturing elevator equipment with 15 years of documented experience.

F. Installer: Employees and supervisor on payroll of the elevator manufacturer or a licensed franchisee of the elevator manufacturer.

G. Comply with ANSI A17.1 and ANSI C2 and as supplemented in this Section.

H. Welding: Comply with AWS D1.1.

1.05 SUBSTITUTIONS

A. Product Substitution - Certain manufactured articles specified herein are mentioned under one or more trade or manufacturer's names. These manufactured articles, as specified, shall form the basis of the contractor's bid. Additional products will be permitted by addendum only.

B. Articles of other manufacturers, of equivalent design, quality and capacity, as adjudged by the Designer, will be considered no later than ten (10) working days prior to bid date. Establishing proof of the equality of the product to that specified shall be the responsibility of the bidder. Determination of equality of all products is vested in the Consultant, whose decision shall be final and binding upon all concerned. No substitutions will be allowed after the Contract is awarded.

C. Where a Contractor proposes to use an item of equipment other than that specified or detailed in the specification that requires any re-design of any other part of the mechanical, electrical or architectural layout, all such re-design and all new drawings required therefore shall be prepared by the Contractor, at his own expense. And, should this re-design require additional cost to other Contractors, this expense shall be borne by the contractor making such changes. All changes shall be approved by the Owner.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 017821.

B. Include description of the Lift system’s method of operation and control including group supervisory control system, motor control system, door operation, signals, special service provisions, emergency power operation, and special or non-standard features provided.

C. Provide parts catalog with a complete list of equipment replacement parts, with equipment description and identifying numbers.

D. Provide a legible schematic of wiring diagrams covering electrical equipment installed, including changes made in the accepted work of this Section, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.

E. Provide one copy each of the following items behind plastic or glass glazing, in a metal frames, mounted adjacent to each other on a machine room wall in a location which is readily accessible for reference.
   1. Master electrical schematic.
   2. Lubrication chart.
1.07 MAINTENANCE MATERIALS
   A. Provide one set of the programming tools and testing equipment required for reprogramming and testing of the controller.

1.08 PREINSTALLATION CONFERENCE
   A. Convene a pre-installation conference at least one week prior to commencing work of this Section.
   B. Require attendance of persons directly involved with the work of this Section.
   C. Review schedule of installation, installation procedures and conditions, and coordination with related work.

1.09 WARRANTY
   A. Provide a one year manufacturer’s warranty under provisions of Section 017821, commencing at the date of Final Completion of the Project.
   B. Include coverage of the system controller and operating equipment and devices.

1.10 TESTS
   A. Provide inspection and testing of system.
   B. Obtain and pay for municipal and state permits and inspections required.
   C. Conduct tests required by governmental agencies.
   D. Schedule tests so that the authority having jurisdiction, the Designer, the Owner and the Contractor are all present during tests.

1.11 DELIVERY, STORAGE AND HANDLING
   A. Deliver items to the site and handle, store and protect under provisions of Section 016000.
      1. Do not deliver materials until the areas in which they are to be installed are ready to receive them.
      2. Fully protect movable and operating equipment from the weather.
      3. Ensure that factory finishes are wrapped and crated to protect from damage.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
   A. ABC Docs, LLC
      105 SE Parkway
      Suite 111
      Franklin, TN 37064
      (800) 394-5944
   B. Southworth Products
      11 Gray Road
      Falmouth, Maine 04105
      Email sales@southworthproducts.com
      Voice 800-743-1000
   C. Vestil Manufacturing Corp.
      2999 North Wayne Street
      P.O. Box 507
      Angola, IN 46703
      Phone: 260-665-7586
   D. Advanced Lifts, Inc
      701 S. Kirk Road
      St. Charles, IL 60174
      Phone: 630-584-9405
2.02 EQUIPMENT SUMMARY

A. Existing loading dock lift is a Trepel scissor lift- German manufactured dual hydraulic ram – No rating and no railing or safety chain.

B. Manufacturer & Type for new equipment: This specification covers a hydraulic dock lift as manufactured by an acceptable manufacture noted above or equal.

C. Capacity: The lift shall have a lifting capacity of 5000 lbs. with a 50% axle loading capacity over the hinged throw-over plate end and opposite end. Axle loading capacity over the sides shall be 50%.

D. Travel: The lift shall have a vertical travel of 59” from a lowered height of 16”.

E. Speed: The lift shall have a nominal rise speed of 20 FPM.

F. Platform: The platform size shall be 80” wide X 54” deep with diamond plate deck surface. Platform will incorporate bevel toe guards on four sides, painted safety yellow.

G. Bridge Plate: The platform shall be equipped with a 18” X 60” diamond tread throw-over plate on one end. The split plate shall have full length hinge.

H. Handrails: The platform shall be equipped with 42” high removable steel handrails on two sides with midrail and 4” kick plate. The rail sockets shall be flush with the platform surface.

I. Power Unit: The external hydraulic power unit shall be self-contained and filled with hydraulic oil. The motor shall be 3.2 HP.

J. Control: The lift shall be equipped with a constant pressure “UP/DOWN” weatherproof push button, NEMA 3R, on 20’ Koil Kord to allow operator to control lift while on the machine. Control voltage shall be 24 volts.

K. Cylinders: The lift shall be equipped with single acting cylinders having honed seamless tubing, chrome-plated cylinder rods, a metal wiper/scaper in the rod bearing to exclude harmful contaminants, and vent side of cylinders shall be piped back to power unit.

L. Hydraulic Oil: The lift shall be supplied with Biodegradable hydraulic oil, or equivalent. The hydraulic oil shall be a turbine quality oil with rust and oxidation inhibitors plus anti-wear properties.

M. Bearings: All pivot points shall have hardened steel pins which operate in long lasting self-lubricated bearings.

N. Quality Control: The lift shall be pretested by seller to 10% over full rated capacity.

O. Safety: The lift shall incorporate excess flow protectors at the cylinders to prevent descent from loss of hydraulic pressure. The power unit shall incorporate adjustable pressure compensated flow control to maintain uniform lowering speed.

PART 3 – EXECUTION

3.01 PREPARATION

A. Inspection:
   1. Verify that hoistway, pit and machine room are ready for work of this Section.
   2. Verify shaft openings are of correct size and within tolerances.
   3. Verify location and size of machine foundation and position of machine foundation bolts.
   4. Confirm electrical power is available and of correct characteristics.
   5. Report deficiencies in writing.

TN TOWER
JNASHVILLE, TN
145000-4
LOADING DOCK LIFT
REPLACEMENT SCISSOR LIFT
B. Arrange for temporary electrical power to be available for installation work and testing of lift components.

3.02 INSTALLATION
A. Hoistway & Machine Room Construction: Contractor shall confirm existing dimensions of machinery rooms, hoistway, and pit, prior to fabricating and installing lift. Examine all parts of the supporting structure and the conditions under which the lift work is installed.

3.03 DESIGNER FIELD INSTRUCTIONS
A. During construction, the Designer will give field instructions as required without invalidating the Contract.
B. Such field instruction shall not be construed as authority to change the terms of the contract.
C. In cases where extra cost or project scope change of the Contract are involved, the Contractor shall notify the Designer at the time of such instructions and shall establish cost difference and receive written approval before proceeding.
D. The Contractor shall not be reimbursed for extra work unless the above procedure has been followed.

3.04 SITE CLEAN UP
A. Contractor shall remove from site, and legally dispose of, all rubbish resulting from the work under his Contract.
B. Contractor shall provide a separate dumpster located on site as directed by the Owner’s Representative.
C. Rubbish shall be removed daily and not allowed to accumulate or overflow the dumpster.

3.05 SAFETY
A. Contractor to be responsible for the maintenance of all safety barricades at hoistway openings from the point they start their work until such time as the hoistway doors are adequately and safely installed and operational.

3.06 CLEANING
A. Remove protective coverings from finished surfaces.
B. Clean surfaces and components ready for inspection.

3.07 ADJUSTING
A. Operate unit and make necessary adjustments to ensure lift operate smoothly and accurately.
B. Adjust for smooth acceleration and deceleration of dock lift.
C. Adjust automatic floor leveling feature at dock to achieve 1/4 inch from flush

3.08 PROTECTION
A. Protect finished installation under provisions of Section 015000.
B. Locate and protect or lock moveable equipment and controls so they can only be operated by authorized persons.
3.09 ACCEPTANCE & RELIABILITY

A. Copies of all inspection/ acceptance certificates and operating permits, as required by governing authorities to allow normal, unrestricted use of equipment, shall be provided when the lift is accepted for beneficial use.

3.10 WARRANTY

A. Warranty shall include 8 hour call back service, correcting operation faults and restoring/replacing defective/ deteriorated components and finishes, lubricating operational units and supplying expendable materials as required for proper operations. Warranty service shall consist of a minimum of 8 hours per week throughout the one year warranty period starting at Substantial Completion.

1. A service log shall be created and prominently posted per Code requirement. The log shall document a) routine inspection, (b) repairs performed, (c) call backs answered and the nature of the call documented, and (d) corrective action. The Contractor shall assign a technician from his service department to be the responsible warranty person and so notify the Designer. The Contractor should not use construction personnel for the upkeep of equipment during construction, however, may use the construction mechanic in charge for emergency repairs or call backs during regular working hours only. Prorate this commissioning agreement based upon cars taken out of service during the modernization process. Contractor is required to submit the resumes for all mechanics within Davidson County that are qualified to maintain the Vendor’s Destination Dispatch system and whom would be available to assume the installation duties for this Building.

3.11 RELATED WORK - PROVIDED BY GENERAL CONTRACTOR

A. As a part of the replacement there will be some building related work items associated with the lift to meet modernized code requirements. The following survey conditions were noted and will require attention by the general contractor as a part of a turnkey installation. These items will be included under the general contractor and have been detailed in other sections of the specification but are summarized below.

B. Additional scope items required by the elevator contractor are also included below.

C. Lift Related - Includes but is not limited to:

1. Provide all necessary electrical work to properly bring modernization up to current ASME and NEC codes.
2. The 3 phase / single phase disconnects will need to be disconnected and reconnected by a licensed electrician. All disconnects are to be fused.
3. If new electrical disconnects are required then provide. We will need to verify if there is a true ground available. Auxiliary contact is needed. Electrical will be reviewed by electrician prior to bidding.
4. Provide GFI outlets in pit. Proper lighting in machine room and pits to comply with Code.

END OF SECTION
SECTION 230500

COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Common work results for requirements specifically applicable to Division 23.

B. Requirements of Division 01 Specifications, General Provisions of the Contract, General and Supplementary Conditions apply to this Division.

1.02 REFERENCES

A. ANSI: American National Standards Institute

B. ARI: American Refrigeration Institute

C. ASHRAE: American Society of Heating Refrigeration and Air Conditioning Engineers

D. ASME: American Society for Mechanical Engineers

E. ASTM: American Society for Testing and Materials

F. AWWA: American Water Works Association

G. FM: Factory Mutual

H. IRI: Industrial Risk Insurers

I. MSS: Manufacturer's Standardization Society of the Valve and Fitting Industry

J. NEMA: National Electrical Manufacturers' Association

K. NFPA: National Fire Protection Association

L. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association

M. UL: Underwriters' Laboratories, Inc.

N. U.L. Fire Resistance Index


1.03 SUBMITTALS

A. Submit under provisions of Division 01.

B. Incomplete submittals containing unmarked cutsheets or not providing specific detail of what is being proposed will be rejected and will not be reviewed.

C. Include Products as specified in the individual sections of Division 23.

D. Submit shop drawing and product data grouped to include complete submittals of related systems, products, and accessories in a single submittal.
E. Prepare shop drawings completely independent of the Engineer of Record’s CADD files. Should the Contractor or Vendor wish to use the Engineer of Record’s CADD files as the basis for developing their shop drawings, a release form, obtainable from the Engineer or Architect, must be signed and a nominal charge of $30.00 per sheet must be made payable to the engineering firm to cover the cost of preparing the drawings for use by others.

F. Submit copies of shop drawings in accordance with Division 01, including:
   1. Building Automation System including direct digital control drawings.

G. Brochures: Submit manufacturer’s product data and brochures including:
   1. Complete descriptions
   2. Illustrations
   3. Rating data, accessories, dimensional data, and applicable options and features marked for the specific items scheduled on drawings and specified herein.
   4. Capacities stated in the terms specified.
   5. Performance curves for all air handling units, fans, and pumps.

1.04 REGULATORY REQUIREMENTS

A. Perform Work specified in Division 23 in accordance with standards listed below of the latest applicable edition adopted by the authority having jurisdiction. Where these Specifications are more stringent, they shall take precedence. In case of conflict, obtain a decision from the Designer.
   1. NFPA 90A: Air Conditioning and Ventilation Systems
   3. ANSI Handicapped Code-A117.1
   4. U.L. Fire Resistance Index
   5. ASTM E814-08B: Standard Test Method for Fire Tests of Penetration Firestop Systems
   6. Special regulations, supplement, and amendments of the State and/or local authorities having jurisdiction.

B. Comply with the applicable edition date of each regulation as adopted by the authorities having jurisdiction.

1.05 PROJECT/SITE CONDITIONS

A. Layouts indicated on drawings are diagrammatical and intended to show relative positions and arrangement of equipment, ductwork and piping. Coordinate mechanical work with other trades and measurements obtained at the job site, as applicable, prior to installation. Generally, install work in locations shown on Drawings, using as necessary rises, drops, offsets, transitions, and alternate routings to fit in the available space unless prevented by Project conditions.

B. If prevented by project conditions, prepare drawings showing proposed rearrangement of Work, including changes to Work specified in other sections. Obtain permission of Designer before proceeding.

C. Place anchors, sleeves, and supports prior to pouring concrete or installation of masonry work.

D. Cause as little interference or interruption of existing utilities and services as possible. Schedule work which will cause interference or interruption in advance with Owner, authorities having jurisdiction, and all affected trades.

E. Visit site and be informed of conditions under which Work must be performed.

F. Locate equipment requiring periodic servicing so that it is readily accessible. Provide means of service access, following appropriate manufacturer’s recommended service clearance space or, as applicable, means of access using duct, wall, or ceiling access doors.
G. Install ductwork and piping to leave sufficient space for AHJ inspection of wall construction.

1.06 FEES AND PERMITS

A. Obtain and pay for all necessary permits and inspection fees required to perform Division 23 work.

1.07 COMPLETENESS OF WORK

A. The Contract Documents depict HVAC systems which are intended to be complete and functioning systems. All products, materials, and labor necessary to render a fully functional system to fulfill the design intent shown on the documents shall be provided by the Contractor.

B. Catalog numbers referenced throughout the Division 23 Drawings and Specifications are intended to convey a general understanding of the type and quality of the product required. Where written descriptions differ from information conveyed by a catalog number, the written description shall govern. No extra shall be allowed because a catalog number is found to be incomplete or obsolete.

1.08 REFERENCE STANDARDS AND DEFINITIONS

A. Comply with provisions of Division 01.

1.09 PRODUCT SUBSTITUTIONS

A. Comply with provisions of Division 01.

1.10 RECORD DRAWINGS

A. Provide record drawings that illustrate the work of Division 23 as finally constructed. Deliver record drawings to the Designer in a form suitable for production.

B. Record drawings shall reflect all changes made to the Contract Documents, whether generated by addenda, change orders, or field conditions. Maintain a daily record of these changes and keep current set of drawings showing these changes.

C. Deliver record drawings to Designer within 30 days of Substantial Completion.

1.11 OWNING AND OPERATING MANUALS

A. Comply with the requirements of Division 01, but provide a minimum of three sets.

B. Manuals shall include clear and comprehensive instructions with appropriate graphics and project specific marked data to enable owner to operate and maintain all systems specified in this Division.

C. Copies of final reviewed submittals indicating all model numbers, serial numbers, cut sheets, and all performance criteria on furnished equipment shall be included.

PART 2 - PRODUCTS

2.01 EQUIPMENT SUPPORTS

A. Structural Steel for Supports: ASTM A36.
   1. Use galvanized members installed in fan plenums or areas of high humidity or condensation, and outside. All fasteners shall be stainless steel. Any damage caused by cutting, drilling, or welding or any other means to galvanized surface must be repaired by apply two coats of cold-galvanizing.
2. Furnish other members with shop coat of red primer.
3. Retouch primer after field welding.

2.02 FLASHINGS AND COUNTERFLASHINGS

A. Furnish materials and coordinate installation for flashing and counterflashing roof penetrations for vents, pipe, drains, and ducts.

B. Materials:
   1. Sheetmetal: 24-gauge minimum ASTM A525, Class G90.
   2. Sheet Lead: 3 pounds per square foot.
   4. Sheet Copper: 24 oz/sf
   5. Vent Stack Fitting: Josam 1830 or Jay R. Smith 1750

2.03 WALL AND CEILING ACCESS PANELS

A. Style and type as required for material in which installed.

B. Size: 24"x24" minimum, as indicated, or as required to allow inspection, service and removal of items served.

C. 14-gauge minimum sheet metal for doors, 16-gauge frames of cadmium-plated or galvanized construction. Doors shall have expanded plaster rings where located in plaster walls or flanged finish where located in drywall or block construction.

D. Panels shall have spring hinges with screwdriver locks in non-public areas. Key lock, keyed alike, for panels in public areas.

E. Prime painted or rust inhibitive paint finish.

F. UL labeled when in fire-rated construction, 1-1/2 hour rating.

G. Provide in walls, floors, and ceilings to permit access to all equipment and piping requiring service or adjustment. Examples of such equipment needing access are fire and/or smoke dampers, mechanical system valves, and equipment needing periodic or replacement maintenance.

H. Furnish and locate access panels under this Division. Coordinate with trades who are responsible for building system in which panels are to be installed.

I. Acceptable Manufactures: Milcor, Nystrom, Karp, J.L. Industries or Williams Brothers.
   1. For masonry and drywall construction: Milcor Style M.
   2. For plastered masonry walls and ceiling: Milcor Style K.
   3. For ceramic tile or glazed structural tile: Use stainless steel panels.

2.04 SLEEVES

A. Materials:
   1. Concrete Floors, Concrete and Masonry Walls: 18-gauge galvanized sheetmetal.

B. Sleeves shall be sized such that the annular space between outside surface of pipe or pipe insulation and the inside surface of the sleeve is not less than 1/2". Provide larger annular space if required by firestopping product installation instructions.

C. Sleeves supporting riser piping 4" and larger shall have three 6" long reinforcing rods welded radially at 120 degree spacing to the sleeve and shall be installed with the rods embedded in the concrete slab.
2.05 ESCUTCHEON PLATES

A. Provide B and C No. 10 or equal chrome-plated escutcheon plates where pipes penetrate partitions or ceilings in finished areas.

PART 3 - EXECUTION

3.01 CUTTING AND PATCHING

A. Repair or replace damage caused by cutting or installation of work specified in Division 23.

B. Perform repairs with materials which match existing and install in accordance with the appropriate section of these specifications.

3.02 FLASHING AND COUNTERFLASHING

A. Counterflash ducts and pipes where penetration of roofs and outside walls occur.

3.03 DELIVERY, STORAGE, AND PROTECTION

A. Insofar as possible, deliver items in manufacturer's original unopened packaging. Where deliver in original packaging is not practical, provide cover and shielding for all items with protective materials to keep them from being damaged. Use care in loading, transporting, unloading, and storing to keep items from being damaged.

B. Store items in a clean, dry place, and protect from damage. Mechanical equipment may not be staged or stored outdoors unless intended for outdoor use.

C. Protect nameplates on motors, pumps, and similar equipment. Do not paint or insulate over nameplate data.

D. Protect valves and piping from damage. Cover equipment during work of finishing trades.

E. Keep dirt and debris out of pipes and ducts.

F. Repair, restore, and replace damaged items.

G. Cover factory finished equipment during work of finished trades, such as fan coils, fin tubes, etc.

H. Protect cooling and/or heating coils with temporary filter media during construction.

3.04 SLEEVES

A. Floors: Sleeve all pipe penetrations. Extend sleeve 1-1/2" above finished floor, except piping within pipe chases. Sleeve shall be flush with underside of floor.

B. Masonry or Concrete Walls: Sleeve all pipe penetrations. Sleeves shall be flush on both sides of wall.

C. Drywall Partitions: Sleeve all penetrations of piping in systems over 160 degree F.

D. Seal voids between outside surface of sleeve and wall, partition or floor. Seals shall be airtight.

E. Install piping, insulation and sleeves in strict accordance with applicable U.L. floor or partition assembly instructions. Coordinate with Division 07 Firestop manufacturer's installation instructions.
F. Penetrations not Sleeved or Firestopped:
   1. Seal voids between pipe and partition. Seals shall be airtight.

3.05 ESCUTCHEON PLATES

A. Provide chromium-plated escutcheon plates for exposed uninsulated pipes projecting through floors or walls in "finished" spaces. Mechanical rooms, store rooms, electric closets, and janitor closets are not considered "finished" spaces.

B. Clearance between sleeve and pipe: Minimum of 1/2 inch for hot piping and 1 inch for cold piping or as otherwise dictated by U.L. Fire Resistance Directory.

3.06 EQUIPMENT GUARDS

A. Use suitable structural frames with minimum 12-gauge, 3/4" galvanized mesh, or expanded metal mesh. Attach to equipment by removable clips and bolts with wing nuts, or other approved connectors.

B. At belts, provide opening for measuring RPMs.

C. Provide at all belts, couplings, moving machinery and equipment.

D. Design for easy access to belts and other items requiring replacement.

E. Comply with OSHA Regulations.

3.07 CLEANING HVAC SYSTEMS

A. General Cleanup:
   1. Upon completion of contract and progressively as work proceeds, clean up dirt, debris, oil materials, etc., and remove from site, keeping premises in neat and clean condition to satisfaction of the Designer. See Division 01 of specifications for further requirements.
   2. Seepage, discoloration, or other damage to parts of the building, its finish, or furnishings due to Contractor's failure to properly clean piping systems or duct systems shall be repaired without cost to the Owner.

B. Factory Finishes:
   1. Clean items with factory finishes. Touch up bare places, scratches and other minor damage to finishes. Use only factory supplied paint of matching color and formula. If finishes are badly damaged or if there are many damaged, scratched or bare places, refinish the entire item.

C. Ducts and Apparatus:
   1. Thoroughly clean ducts and apparatus casings before fans and filters are operated.

3.08 OPERATION OF HVAC SYSTEMS DURING CONSTRUCTION

A. Install specified filters prior to system operation. In addition to specified filters, install a roughing filter upstream of mixed air filter. Roughing filter shall consist of two layers of roll filter media clipped and sealed to entering side of filter frame. Change roughing filter as necessary to minimize dust collection on specified filters.

B. Cover return and exhaust air grilles with temporary filter media. Attach media to avoid damage to grille or ceiling. Change temporary media as required to protect against dust buildup on ductwork. Remove temporary media from grilles after flooring is installed, walls are sanded and painted and other dust generating construction has been completed.
C. During periods of excessive dust generation such as drywall sanding, seal off return and exhaust openings and grilles to prevent dust from accumulating in ductwork.

D. Furnish and install a new set of specified filter media prior to start of system test and balance. Furnish a new, clean set of the specified media and turn over to Owner's Representative.

3.09 TESTING MECHANICAL SYSTEMS

A. Test all systems and equipment installed to demonstrate proper operation.

B. Advise Designer of scheduled systems testing and completed system demonstration/operation schedules so that he may witness, if desired.

C. Correct and retest work found defective when tested.

D. Make repairs to piping systems with new materials. Peening, doping, or caulking of joints or holes will not be acceptable.

E. Ductwork Pressure Testing: Refer to Section 23 31 13 for required pressure testing for ductwork.

F. System Balance and Testing: Prepare to assist test and balance firm by assuring systems are complete and operational.

G. Test all fire dampers by manually disconnecting linkage and observing blades fall into position.

H. Test all smoke and combination fire/smoke, dampers by observing damper operation during fire alarm system commissioning.

I. Records of Testing: Maintain records of system testing and results thereof. Deliver results as part of project closing file and on an intermediate basis as requested by Designer.

END OF SECTION
PART 1 - GENERAL

1.01 RELATED WORK

A. Division 26: Electrical

1.02 SUBMITTALS

A. Submit motor information with submittals and shop drawings for Division 23 equipment.

1.03 REFERENCE STANDARDS

A. Each motor, controller and all components shall be designed, manufactured and tested in accordance with the following latest applicable standards:
   1. National Electric Manufacturers Association Standards (NEMA)
   2. NEMA MG 1 - Motors and Generators
   3. NEMA MG1, Part 31 - Definite Purpose, Inverter Fed Motors
   4. NFPA 70 - National Electrical Code (NEC)
   5. IEEE-112, Test Method "B"
   7. NEMA - ICS-3-303
   8. IEEE STD 444 (ANSI C34.3)

B. All equipment and material to be furnished and installed on this Project shall be UL or ETL listed, in accordance with the requirements of the authorities having jurisdiction, and suitable for its intended use on this Project.

PART 2 - PRODUCTS

2.01 MOTORS


B. In general, motor voltages shall be as follows, unless specified or indicated otherwise:
   1. 3/4 hp and larger: 460V, three (3) phase, 60 hertz
   2. Smaller than 3/4 hp: 120V, one (1) phase, 60 hertz
C. All motors shall be started across the line, unless specified otherwise. All motors 100 horsepower and larger shall be suitable for wye-delta starting unless specified otherwise. Motors shall be selected with low starting current and shall be designed for continuous duty to provide the running torque and pull in torque required to suit the load. Unless otherwise indicated on the Contract Documents, all motors shall be single speed (1750 rpm). All motors shall have standard open drip-proof enclosures unless otherwise specified. All motors exposed to the actually installed outside in the weather shall be of the totally enclosed fan cooled (TEFC) or totally enclosed air over (TEAO) types. All motors not utilized with variable speed drives shall have a minimum service factor of 1.15 and shall be selected to operate at design conditions without exceeding their nameplate rating (without exploiting the service factor rating). Motors used in conjunction with variable speed drives shall have a 1.00 service factor unless otherwise indicated and be compatible with the drive and rated for inverter output duty. Two (2) speed motors shall be two (2) speed, two (2) winding or two (2) speed, single winding type as specified herein and as indicated on the Contract Documents.

1. Standard open drip-proof three (3) phase motors ten (10) horsepower and smaller shall have cast aluminum end bells with steel frames. Three (3) phase motors fifteen (15) horsepower and larger shall have cast iron end bells and housings.

2. Standard open drip-proof single phase motors shall have cast aluminum end bells with steel frames.

3. Totally enclosed fan cooled (TEFC) and totally enclosed air over (TEAO) three (3) phase motors shall have cast iron housings. TEFC motors shall have corrosion resistant fans.

D. Windings and Insulation:

1. All motors shall have copper windings.

2. Motors shall be equipped with Class B, 80ºC rise or Class F, 105ºC rise insulation suitable for use in a 40ºC ambient temperature. All motors used for cooling tower applications shall be equipped with Class F, 105ºC rise insulation suitable for use in a 40ºC ambient temperature. Windings shall be treated with an epoxy varnish to inhibit the absorption of moisture.

E. Bearings:

1. Single phase, fractional horsepower motors shall be equipped with quiet operating, all angle, babbitt-lined sleeve bearings.

2. Polyphase motors shall be equipped with deep groove type ball bearings, generously sized for the loads to which applied and for severe duty application. Provide the necessary seals on the shaft to keep the bearing system free of contamination and moisture. Lubricant shall be high temperature, non-bleeding grease.

   a. Provide inlet and outlet plugs on poly-phase motors so that grease fittings can be easily inserted for bearing relubrication except as otherwise specified. The end shields shall be carefully machined to add extra grease capacity. Lower outlet plugs shall be equipped with combination breather/drains on TEFC and TEAO motors.

F. Motors shall be specifically designed for quiet operation and for severe duty. Standard open drip-proof motors shall be equipped with aluminum or stainless steel stamped nameplates. Totally enclosed fan cooled and air over motors shall be equipped with stainless steel stamped nameplates with either zinc or cadmium-plated hardware. Motor nameplates shall clearly indicate frame size, horsepower, frequency, voltage, speed, starting torque class, insulation class, service factor and winding material.

G. Motors on belt driven equipment shall have slide rails with adjusting screws for belt tension adjustment. Motors exposed to the weather shall be weather protected.
H. Motors specified with variable frequency drive controllers shall comply with NEMA MG1, Part 31 for Definite Purpose, Inverter Fed motors including insulation meeting the requirement for 1600 Vpk at 0.1 μS rise time. In addition to compliance with MG1, Part 31, motors also shall be designed for starting across the line and specifically designed to reduce in-rush current.

1. To protect motor bearings and shafts from damage due to induced electrical currents along the motor shaft, provide Aegis SRG, conductive microfiber motor shaft grounding ring on the driven-end of all inverter fed motors. For inverter fed motors 100 HP and larger, also provide either an insulated motor bearing or a ceramic bearing on non-driven end of motor. Comply with manufacturer's installation instructions and with NEMA MG1, Part 31, Section 31.4.4.3 for inverter-fed motor bearings.

I. Install premium efficiency electric motors for motors 1 horsepower and above. Premium efficiency motors shall have efficiency and losses determined in accordance with the latest revisions of IEEE Standard 112. Polyphase squirrel-cage motors rated 1 through 125 horsepower shall be tested by dynamometer method B. The efficiency will be determined using segregated losses in which stray load loss is obtained from a linear regression analysis to reduce the effect of random errors in the test measurements. Guaranteed minimum load efficiency shall be as follows:

1. HP: 3/4 Eff: 80.0%
2. HP: 1 Eff: 84.0%
3. HP: 1-1/2 Eff: 86.5%
4. HP: 2 Eff: 86.5%
5. HP: 3 Eff: 89.5%
6. HP: 5 Eff: 89.5%
7. HP: 7-1/2 Eff: 91.7%
8. HP: 10 Eff: 91.7%

J. Sound power levels not greater than recommended in NEMA M61-12.49. VFD duty rated motors shall not increase by more than 3 dB when operating on VFD.

K. Provide motors with drive shafts long enough to extend completely through belt sheaves when sheaves are properly aligned or balanced.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Arrange and set motors.

B. Line up motors on direct drive equipment using dial type gauges.

C. Make connections and test motor for proper rotation/phasing under Division 26.

3.02 ADJUSTMENTS

A. Motors, together with driven equipment, shall be dynamically and statically balanced. Imbalance shall be reduced to minimum specified by equipment manufacturers.

END OF SECTION
SECTION 230523
GENERAL-DUTY VALVES FOR HVAC

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Valves for chilled water systems.

1.02 RELATED REQUIREMENTS

A. Section 23 21 13 - HVAC Piping

1.03 SUBMITTALS

A. Submit product data for review in accordance with the requirements of Division 01.

B. Indicate valve service, construction material, sizes and locations to be used.

1.04 QUALITY ASSURANCE

A. Valve Bodies, Shells, and Seats: Factory tested.

B. Bronze Body Valves:
   1. Materials for pressure containing parts: ASTM B-62 (less than 200 psi), B-61 (200 psi and above)
   2. Design, workmanship, testing: MSS-SP-80

C. Butterfly Valves:
   1. Face-to-face and end-to-end dimensions: MSS-SP-67

D. Valve Stems: ASTM B584-78, Class 13C (cast silicon brass), ASTM B-371-79, Alloy A (rolled silicon brass), or other material equally resistant to dezincification.

E. Pressure Castings: Free of impregnating materials.

F. Valve name or trademark and working pressure stamped or cast into body.

G. Standard for 200 PSI and 300 PSI valves with metallic seats: ASTM B61-76.

PART 2 - PRODUCTS

A. ACCEPTABLE MANUFACTURERS

B. Bronze Body Valves: Dezurik, Kennedy, Kitz, Milwaukee, Nibco, or Stockham.

C. Butterfly Valves: Crane, Dezurik, Keystone, Kitz, Milwaukee, Mueller, Nibco, or Stockham.

D. Ball Valves: Apollo, Hammond, Jamesbury, Kitz, Milwaukee, Nibco, or Watts.

2.01 MATERIALS

A. Nibco Figure numbers are indicated below unless noted otherwise.

B. HVAC Circulating Water Piping:
   1. System pressures 125 psi and less: Figure W-910-B, Iron body, bronze seat and disc, non-slam, Class 125.
C. Ball Valves:
   1. HVAC Circulating Water Piping:
      a. 2" and less, Figure T-585-70 or S-585-70, 2-piece, bronze, full port, 600 psi, WOG, PTFE seats.
   2. Provide ball valves with locking handles.
   3. Provide extended lever for insulated service.

D. Butterfly Valves - 2-1/2" and larger:
   1. HVAC Circulating Water Piping: Figure LD-2000, ductile iron body, lug type, 200 psi, Class 125, EPDM liner and seals, aluminum bronze disc.
   2. Butterfly valves rated bubble tight for dead end service at full pressure in both directions without the need for downstream blind flange.

E. Valve Connections: Two inches and smaller - threaded; 2-1/2 inches and larger - flanged.

PART 3 - EXECUTION

3.01 INSTALLATION

   A. Furnish and install valves in each piping connection at each piece of HVAC equipment to allow equipment to be isolated from piping systems.

   B. Furnish and install valves in all piping systems to isolate each floor or main section of the building. Install sufficient number of valves to minimize the portion of the system which must be shut down for service or maintenance purposes.

   C. Install valves in water piping systems so ordinary maintenance work can be performed on the equipment that the valves isolate, without having to drain the system beyond the valve.

   D. Locate valves so as to be easily accessible by maintenance personnel. Installation shall be made so that the valve can be fully opened and have a minimum clearance of 6" beyond valve stem end at the full open position and will include sufficient clearance for removal of stem for repair.

   E. Identify valves as required by Section 23 05 53.

END OF SECTION
SECTION 230529

PIPE HANGERS

PART 1 - GENERAL

1.01 RELATED WORK

A. Section 23 07 00: HVAC Insulation
B. Section 23 20 00: HVAC Piping

1.02 SUBMITTALS

A. Submit product data for review.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Anvil, Carpenter and Patterson, Fee and Mason, B-Line, Viking, Reliable, and Michigan. Anvil numbers are used for reference.

2.02 HANGERS

A. Anvil Figure #260 MSS Type 1, clevis hangers for:
   1. Non-insulated steel and galvanized piping 2” through 24” diameter
   2. Non-insulated cast iron pipe
   3. Non-insulated PVC piping

B. Anvil Figure #260 clevis hangers with Figure 167, MSS Type 40 galvanized insulation protection shields (sized for supporting insulation having a compressive strength of 4 psi). Support piping on outside of insulation. Size hangers so that pipe insulation passes through them without interruption.
   1. All other insulated piping

C. Anvil Figure CT-69, MSS Type 10 with adjustable wrought tubing ring hanger, copper plated for:
   1. Non-insulated copper tubing with no longitudinal movement

D. Anvil Figure #171, MSS Type 41 with pipe roller, Anvil Figure #16x protection saddle and Anvil Figure 167, MSS Type 40 galvanized insulation protection shields (sized for supporting insulation having a compressive strength of 4 psi, at 8 foot intervals). Support piping on outside of insulation. Size hangers so that pipe insulation passes through them without interruption. Use these for:

E. Anvil Figure #CT-121, MSS Type 8, riser clamps (at floor penetrations) to support:
   1. Copper pipe risers

F. Anvil Figure #261, MSS Type 8, riser clamps (at floor slab penetrations) to support:
   1. Steel pipe risers
   2. PVC pipe risers

G. Anvil Powerstrut Trapeze Hangers: Where three or more lines of pipe run parallel, support them with trapeze hangers, sized for maximum 3/16” deflection.
2.03 INSERTS

A. Concrete Insert: Anvil Figure #281, MSS Type 18, universal concrete inserts, adequately sized and correctly positioned to support full load operating systems.

B. Concrete Insert, Wedge Type: Anvil Figure #281, 1/4" to 7/8".

C. Lightweight Concrete Insert: Anvil Figure #285.

D. Continuous Concrete Insert: Anvil Powerstrut Figure #PS-349 pre-galvanized.

2.04 EXPANSION ANCHORS

A. Hilti Kwik-bolt, zinc-plated, metal expansion anchor.

B. Anchor to meet U.L., ICBO-4627 and FM listings.

2.05 CLAMPS

A. C-Clamps: Anvil Figure #92, MSS Type 23.

1. Use these for attaching hangers to steel beams. Do not weld hanger rods to structural steel members.

B. Malleable Beam Clamps: Anvil Figure #218, MSS Type 30: Use these for attaching hangers to bar joists.

2.06 HANGERS RODS

A. Provide mild steel, all-thread rods with maximum loads as follows:

1. 3/8" - 300 lbs
2. 1/2" - 600 lbs
3. 5/8" - 1,200 lbs
4. 3/4" - 2,000 lbs
5. 1" - 5,000 lbs

PART 3 - EXECUTION

3.01 PIPE HANGERS

A. Support pipes on specified hangers so that equipment, pumps, and fittings do not bear weight or stresses from vibration and swaying of pipe. Support pipe risers at regular intervals in pipe shafts at least once at each floor level or a maximum of 12'-0" apart. Do not use perforated metal, strap iron, or band iron. Do not make offsets in hangers.

B. Maximum allowable spacing of pipe hangers is listed below. Space hangers and brackets at closer intervals where necessary to maintain levels, slopes, and drainage, or to prevent sagging or swaying of pipe.

C. Copper Pipe - Vapor:

1. 1/4" to 1" - 5'-0" oc.
2. 1-1/4" to 2" - 8'0" oc.
3. 2-1/2" to 4" - 10' 0" oc.
4. 5" and above -15' 0" oc.
D. PVC Pipe:
   1. 3/4" to 3" - 4' oc.
   2. 4" and above - 8' oc.

END OF SECTION
PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide vibration isolators, pipe supports, and equipment anchors, of appropriate sizes and weight loading to meet the specified deflection requirements, in accordance with instructions of isolator manufacturer.

B. Coordinate installation with other trades (placement of anchor bolts in concrete slabs, etc.)

1.02 QUALITY ASSURANCE

A. Responsibility for Products: Select deflection for spring isolators in accordance with recommendations in the current issue of ASHRAE Handbook of Fundamentals, unless noted otherwise on drawings.

1.03 MANUFACTURER RESPONSIBILITIES

A. Manufacturer of vibration isolation shall have the following responsibilities:

1. Determine vibration isolation sizes and locations for mechanical and plumbing equipment.

2. Provide isolation systems for all plumbing and mechanical of equipment (vibration isolated and non-isolated) and systems (piping and ductwork).

3. Provide installation instructions and drawings.

B. Exact mounting sizes, dimensions and quantity of isolators and static deflection required shall be determined by the isolator manufacturer based upon equipment that will be furnished and installed by the contractor under this Contract.

1.04 SUBMITTALS

A. Contractor's Certification: Vibration isolator submittals shall include a certification, signed by an officer representing the Contractor and stipulating that the submittal prepared by the manufacturer has been reviewed, and checked on an item by item basis against each piece of mechanical equipment, piping, ductwork and panel shown or specified in the Contract Documents, which requires vibration isolation and/or seismic support.

B. Manufacturer's Certification: The manufacturer or manufacturers (if there are more than one) shall each certify that the selections of vibration isolation equipment are based upon the drawings and specifications, and that each piece of mechanical equipment has been examined for rotational speed, equipment type, mounting location, and supporting span between column centers, and that an appropriate isolator has been selected.

C. Product Data: Furnish manufacturer's product data covering each isolator type for style, characteristic, and finish. Isolator quantities, dimensions, deflections, capacities and types shall remain the responsibility of the manufacturer and the contractor.

1.05 STORAGE AND PROTECTION

A. Storage: Store vibration isolation equipment indoors in the manufacturer's original shipping containers. Preclude the entrance of construction dirt and debris. Vibration isolation equipment and bases, which show signs of rust, cement or concrete fouling, dirt and construction debris shall be disassembled and cleaned, approved or removed from the project site and replaced with new.
PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Mason Industries, Inc.
B. Kinetics Noise Control
C. Vibration Eliminator Company
D. Vibration Mountings & Controls, Inc.
E. Korfund Company
F. Amber Booth
G. Furnish vibration isolators by single manufacturer.

2.02 MATERIALS AND EQUIPMENT

A. Materials and equipment shall conform to the respective specifications and other requirements specified below:

2.03 PRODUCTS

A. Type 1: Mason Super "W", 2 layers of 3/4" neoprene pad with 16 ga. galvanized shim.
B. Type 2: Mason BR, two neoprene elements housed in a ductile iron casting.
C. Type 3: Mason SLF, free standing spring isolator, 1/4" neoprene non-skid pad, leveling bolt, spring diameter no less than 0.8 of compressed height at rated load, minimal additional travel to solid equal to 50% or rated deflection.
D. Type 4: Mason SLR, restrained spring isolator, vertical limit stops, internal isolation pad.
E. Type 6: Mason 30N, spring and double neoprene hanger, 1-1/4" neoprene element at top of housing, spring seated in neoprene cup at bottom of housing, designed to allow 30 degrees arc from side to side of hanger rod.
F. Type 13: Mason HS spring hanger, spring seated in neoprene cup.
G. Type 14: Mason WF steel frame base, with motor slide rail.

PART 3 - EXECUTION

3.01 VIBRATION CONTROL

A. Size vibration control equipment in accordance with weight distribution, pull or the imposed torque as shown on equipment shop drawings. Minimum static deflections may be revised subject to prior approval.
B. Provide revised vibration control equipment to match revised or substituted equipment.
C. Install vibration control equipment in accordance with the manufacturer's installation instructions and as specified.
3.02 APPLICATIONS

A. Equipment: Use the restraint types listed above on the following applications:
   1. A/C units, indoor, not internally isolated:
      a. Type 3
   2. A/C units, packaged rooftop: Type 11
   3. Fans, suspended:
      a. Type 6, 14
   4. Blower coil units above 1500 cfm (suspended):
      a. Type 13
   5. Heat pumps (suspended):
      a. Type 13

B. Piping
   1. Provide Type 6 vibration isolation on following piping:
      a. Closest two hangers on piping at air handling unit
   2. Use hold down clamps to attach multiple pipes to trapeze hangers.

3.03 ANCHORING

A. Installation: Installation shall comply with manufacturer's published recommendations and shall be installed so that isolators are plumb and are operating at a manner for which they were designed.

B. Unless otherwise specified, all equipment shall be securely bolted to isolators and steel bases.

3.04 ANCHOR BOLTS

A. If the size and number of the anchor bolts are not shown on the drawings then anchor bolts shall conform to the schedule for the various equipment weights or the manufacturer's installation recommendations, whichever is the most stringent.

3.05 INSTALLATION

A. Set anchor bolts when concrete is placed.

B. Install isolators in accordance with recommendations of isolator manufacturer and equipment manufacturer.

C. Isolate mechanical equipment as indicated.

D. Remove all debris from under equipment, and thoroughly clean steel bases, and check for free movement.

END OF SECTION
SECTION 230553

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Identification of HVAC piping and equipment as specified herein.

1.02 RELATED WORK

A. Section 01 30 00 – Administrative Requirements: Shop Drawings, Product Data, and Samples.
B. Section 01 60 00 – Product Requirements: Product Storage and Handling Requirements
C. Section 01 70 00 – Execution Requirements: Cutting and Patching

PART 2 - PRODUCTS

2.01 NAMEPLATES AND TAGS

A. Acceptable Manufacturers: Seton Nameplate Corporation, Marking Services Inc. or equal.
B. Rigid plastic, "Setonite" or Bakelite with engraved lettering, minimum 1/2" high.
C. Brass tags, at least 1-1/2" inches in diameter, with alpha-numeric I.D., permanently stamped black filled letters showing the service, and black filled numbers showing the valve or equipment number. At substantial completion, a schedule of all valves shall be submitted to the Designer and Owner's Representative.

2.02 PIPE MARKERS

A. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering.
B. Plastic Tape Markers: Flexible vinyl film tape with pressure sensitive adhesive and printed marking.

2.03 PIPE IDENTIFICATION AND PAINTING

A. Identify all piping as specified herein painted under Division 09.
B. Pipe Identification:
   1. Identify piping by stenciling or tagging (to denote contents and direction of flow) on piping at no more than 25 foot intervals at valves, and at least once in each separate space through which the pipe passes. Colors shall conform to ASME 13.1.
   2. Stenciling shall be a minimum of 2" high letters.
C. All piping in equipment rooms shall be labeled to identify contents and direction of flow.

2.04 EQUIPMENT AND APPARATUS IDENTIFICATION

A. Acceptable Manufacturers: Seton Name Plate Corporation or equal.
B. Nameplates: Rigid plastic, "Setonite" or Bakelite, with engraved lettering (indicating names and numbers of mechanical apparatus), a minimum of 1/2" high. Fill engraved lettering with a permanent coloring material which contrasts with color of tag material to allow for easy reading.
C. Use names, numbers, and abbreviations appearing in schedules on Contract Drawings.

D. Where stenciling is used to identify large pieces of equipment, such as boilers, chillers, air handling units, etc., stenciling shall be in a conspicuous place visible from control panel area and of at least one (1) inch letters and/or numbers. Large pieces of equipment may be stenciled with an oil based enamel or semi-gloss latex.

E. Provide nameplates, located in a conspicuous location directly on the equipment or apparatus, for mechanical equipment including, but not limited to:
   1. Starters
   2. Fans
   3. HVAC equipment
   4. Control panels

F. Name Tag Fasteners: Commercial quality, rust resisting nuts and bolts with backwashers, self-tapping screws, or rivets. If equipment surface does not allow for direct attachment, use copper or brass rings to attach tags.

G. Control Diagram Frames:
   1. Seton Name Plate Corporation, No. 111P aluminum frames, or equal by Brady or Avery, with "Plexiglas" or "Lucite" glazing.
   2. Provide control and systems instructions and diagrams, framed and glazed with specified items. Mount framed diagrams on walls in conspicuous, easily accessible places in each separate equipment room housing an A/C system to which the individual diagrams are applicable. The following instructions and diagrams are required:
      a. Electrical control diagrams.
      b. Wiring diagrams.
      c. Sequence of operation, where applicable.
   3. Diagrams and instructions may be reduced in size provided they are easily readable and lettering is not smaller than "10 pt." type.

END OF SECTION
SECTION 230593
HVAC SYSTEMS TEST AND BALANCE

PART 1 - GENERAL

1.01 WORK INCLUDED
   A. Perform test and balance of HVAC systems as specified herein.

1.02 DEFINITIONS
   A. AABC - Associated Air Balance and Control
   B. NEBB - National Environmental Balancing Bureau

1.03 SCOPE OF WORK
   A. Perform test and balance in accordance with AABC or NEBB Standards.
   B. Air and water balance shall be performed by qualified personnel experienced in this field.
   C. The air balance procedure followed and forms used shall agree with AABC or NEBB Standards.
   D. Make changes to pulleys, belts, dampers, impellers, and similar equipment to obtain design conditions as required by TAB procedures.
   E. The Architect may request a recheck or resetting of an air related item within 90 days of the completion of work.

PART 2 - PRODUCTS

2.01 NOT APPLICABLE

PART 3 - EXECUTION

3.01 PROCEDURES
   A. On completion of work, submit three copies of the complete report to include the following:
      1. Dates, time, personnel, status of operating of cooling or heating.
      2. A description of the procedure used for air and water balance.

3.02 AIR SYSTEMS
   A. Balance supply, return, and exhaust air outlets within outlets within 10% 5% of design while still maintaining required pressure relationships.
   B. On each fan system, measure and report:
      1. Design and actual fan RPM. Fan suction and discharge pressure. Fan total static pressure and pressure drop across components. Design and actual supply, return, and outside air.
      2. Actual and motor nameplate voltage and amperage on fans.
      3. Design and actual entering and leaving air temperatures, heating and cooling.
   C. For diffusers and grilles, measure, adjust, and report:
      1. Design and actual CFM and FPM at each supply, return, and exhaust outlet.

END OF SECTION
SECTION 230700
HVAC INSULATION

PART 1 - GENERAL

1.01 DEFINITIONS

A. Exposed - Equipment, ducts and piping in areas which will be visible without removing ceilings or opening access panels.
B. Concealed - Installed above ceiling, in walls or chases.
C. Outdoors - Exposed to the weather or ambient conditions.

1.02 CERTIFICATION/QUALITY ASSURANCE

B. Fire-Test Response Characteristics: Testing in accordance with ASTM E-84. Insulation and related materials, adhesives, coatings, sealers, jackets and tapes, shall have a fire-test response characteristic of: Flame spread rating of 25 or less; Smoke development of 50 or less.
C. Materials shall meet the requirements of NFPA 90-A.

1.03 SUBMITTALS

A. Submit manufacturer's product data and installation procedures for review.

PART 2 - PRODUCTS

2.01 PIPE AND EQUIPMENT INSULATION

A. Materials for Pipe and Equipment: Provide factory premolded insulation for pipe, pipe fittings, and valves.
B. Fitting Insulation: Same thickness and material as adjoining pipe insulation.
   a. At hanger and support points as specified herein.
C. Flexible Tubular Elastomeric:
   1. Provide fire-retardant closed-cell slip-on flexible type; minimum "R" value of 2.57
   2. Acceptable Manufacturers: Armacell LLC, AP Armaflex; Namco K-Flex, Inc; Aeroflex USA Inc, Aerocel
   3. Use on the following services:
      a. Moisture condensate drains - 1/2" thick

2.02 DUCTWORK INSULATION

A. Blanket Type Duct Insulation:
   1. Minimum 3/4 pound per cubic foot density, factory-reinforced foil-faced, kraft vapor barrier; with a minimum "R" value of 4.0.
   2. Acceptable manufacturers: Johns-Manville, CertainTeed, Knauf, Owens Corning.
   3. Use on the following:
      a. Unlined conditioned supply ducted - 1-1/2" thick.
   1) Insulation may be omitted from low pressure supply ductwork exposed in area served by the ductwork, except where exposed ductwork is in rooms with doors/openings to exterior.
B. Board Type Duct Insulation:
   1. Provide minimum 3 pound per cubic foot density semi-rigid, factory-reinforced foil faced Kraft vapor barrier glass fiber board "system" type insulation; having a minimum "R" value of 4.34, unless otherwise specified.
   3. Use on the following services:
      a. Unlined supply ductwork within equipment rooms - 1-1/2" thick.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

A. Deliver and store insulation materials in manufacturer’s containers and kept free from dirt, water, chemical and mechanical damage.

B. Complete piping and ductwork pressure testing prior to applying insulation.

C. Apply insulation in workmanlike manner by experienced, qualified workmen.

D. Surfaces shall be clean and dry when covering is applied. Covering to be dry when installed and before and during application of any finish, unless such finish requires specifically a wetted surface for application.

E. Adhesives, cements and mastics shall be compatible with materials applied and shall not attack materials in either wet or dry state.

F. Stop duct coverings, including jacket and insulation, at fire penetrations of fire or smoke rated partitions, floors above grade and roofs. "Fan-out" or extend jacketed insulation at least 2" beyond angle frames of fire dampers and secure to wall. Maintain vapor barrier.

3.02 BLANKET TYPE DUCT INSULATION

A. Apply jacketed blanket type glass fiber covering to ducts pulled snug but not so tight as to compress corners more than 1/4". Use insulation having 2" tab, or cut insulation long enough to allow for "peel-off" of insulation from jacket to effect a minimum overlap of 2". Staple lap with flare type staples on 1" centers. Cover standing seams, stiffeners, and braces with same insulation blanket, using 2" jacket lap and staple lap as herein before outlined. Cover and seal all staples with Foster 30-80 reinforced with glass cloth. Do not use pressure sensitive tape.

B. Secure jacket to covering using equivalent of Foster No. 85-20, Childers CP-82 adhesive, or approved equal.

C. For ducts 24" or wider, mechanically fasten insulation to duct bottom, using weld pins having self-locking, metal discs, locating fasteners on not over 12" centers laterally and longitudinally. Seal pins as above.

D. For ducts up to 18" deep, mechanically fasten insulation to duct sides, using one row of pins, plates or discs located on not over 12" centers longitudinally and equidistant laterally between duct top and bottom. For ducts over 24" deep, apply fasteners as before only using minimum of two rows.

3.03 BOARD TYPE DUCT INSULATION

A. Apply jacketed board type glass fiber covering to ducts using weld pins having self-locking coated metal or nylon discs; locate fasteners on not over 12" centers laterally and longitudinally. If insulation is grooved to fit around corners, in order to eliminate as many joints as possible, pin as
required to hold insulation tight to duct, especially on bottom of duct. Seal pins and joints with Foster 30-80 reinforced with glass cloth.

B. Cover all joints, rips, tears, punctures, disc heads, staples, or breaks in vapor barrier jacket with 4" wide woven glass fabric tape embedded in equivalent of Foster 30-80 vapor barrier, fire resistant adhesive. Do not use pressure sensitive tape.

END OF SECTION
SECTION 230750
FIRE RATED DUCT INSULATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Fire-rated insulation for the following applications:
   1. Construction requiring fire-rated enclosure assembly construction.

1.02 RELATED SECTIONS

A. Section 07 84 00: Penetration Firestopping
B. Section 09 21 16: Gypsum Board Shaft Wall Assemblies for Fire-Rated Construction for HVAC Ducts (as an alternative to using fire-rated insulation)
C. Section 23 07 00: HVAC Insulation

1.03 REFERENCES

A. Ventilation Air Duct Enclosure System Test Standards:
   1. ISO 6944-1985; "Fire Resistive Tests - Ventilation Ducts"
   2. ISO 834; "Fire Resistive Tests - Elements of Building Construction"
   3. ASTM E 814 (UL1479); "Standard Test Method for Fire Tests of Through-Penetration Fire Stops"
   4. ASTM E 84; "Standard Test Method for Surface Burning Characteristics of Building Materials"
   5. ASTM D 6329; "Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers"
   6. NFPA 90A; "Standard for the Installation of Air-Conditioning and Ventilating Systems"

B. Independent Listing Agency References:
   1. Underwriters Laboratories (UL)
   3. Intertek Testing Service (ITS) - Label Mark is OPL

C. Health Studies on Bio-solubility of Ceramic and Mineral Fibers:
   1. Long Fiber Fraction Half Life Solubility Study - Performed in accordance with Guideline 97/69/EC dated 5 December 1997 Appendix Q

1.04 SYSTEM DESCRIPTION

A. Work of this section includes labor, material, methods, and equipment to provide a 1 or 2 hour fire-resistive enclosure system for the ducted system scheduled or indicated.

B. Work of this section includes labor, material, methods, and equipment to provide a 1 or 2 hour F and T-Rated through penetration firestop for a floor, ceiling, or wall penetration by a duct system scheduled or indicated.

C. Ventilation Air Ducts: The fire-rated insulation shall be installed by qualified installer directly to the duct to provide a 1 or 2 hour fire resistance-rated shaft enclosure alternative per testing to ISO 6944, ASTM E 814 (UL 1479), and ASTM E 84. Product shall be UL or OPL classified and labeled for the application.

D. Fire-rated insulation shall be used for ducts which penetrate a rated assembly and require a one- and two-hour fire-resistance-rated enclosure per local code.
1.05 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   2. Submit UL and/or Intertek Testing Service (ITS) listings.
   4. Preparation instructions and recommendations.
   5. Storage and handling requirements and recommendations.
   6. Installation methods including the listed details.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 years experience manufacturing similar products.

B. Installer Qualifications: Minimum 2 years experience installing similar products.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship is approved by Architect.
   3. Revise mock-up area as required to produce acceptable work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Deliver materials in original sealed packages, clearly labeled with manufacturing information including product identification, manufacturing lot numbers, and appropriate third party classification listings.

C. Store material out of weather and away from incidental damage.

D. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Thermal Ceramics - FireMaster FastWrap XL or Pyrocat

B. Unifrax - FyreWrap Elite

C. 3M - FireBarrier 15A or 20A

2.02 MATERIALS

A. Ventilation Air Ducts:
   1. A flexible, fully encapsulated duct wrap material to provide 2-hour fire resistive enclosure assembly per ISO 6944 - 1985.
   2. A lightweight, 1.5” thick, 6 pcf, flexible, inorganic, non-asbestos, noncombustible, bio-soluble core insulation blanket.
   3. Blanket insulation must maintain a 2012°F (1100°C) operating temperature.
4. Blanket fiber materials must be tested per EU Regulatory requirements, Directive 97/69/EC for bio-solubility, and verified by an independent laboratory.

5. Provide firestop sealants, tape, insulation pins, clips, banding and other components per manufacturer's instructions to ensure the installation complies with the complete tested system and corresponding Design Listing(s).

6. Product Characteristics:
   a. Thickness: 1-1/2 inch (38 mm).
   b. Nominal Density: 6 pcf
   c. R-Value: 7.35 per layer of fire-rated wrap when tested in accordance with ASTM C 518.
   d. Flame Spread: <25 when tested in accordance with ASTM E 84.
   e. Smoke Development: <50 when tested in accordance with ASTM E 84.

2.03 ACCESSORY MATERIALS:

A. Glass Filament Tape: Minimum 3/4 inch (19 mm) wide used to temporarily secure blanket until permanent attachment using steel banding and/or steel insulation pins.

B. Aluminum Foil Tape: Minimum 3 inches (76 mm) used to seal cut edges.

C. Carbon Steel or Stainless Strapping Material Minimum: 1/2 inch (13 mm) wide and 0.015 inch (.38 mm) thick

D. Steel Insulation Pins: Minimum 12-gauge, length sufficient to penetrate through duct wrap insulation.

E. Insulation Clips: Galvanized steel, minimum 1-1/2 inches (38 mm) round or square.

F. Through Penetration Firestop Sealants:
   1. Packing Material: Remove encapsulation material from fire rated insulation, use core blanket (white) as penetration packing material.
   2. Firestop sealants per applicable building code report and/or laboratory design listings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Remove dirt and dust from surfaces of openings and items penetrating rated floors and rated walls.

3.03 INSTALLATION

A. Install fire-rated insulation in direct contact with the ductwork in accordance with manufacturer's instructions, applicable laboratory listings and building code reports, and referenced standards. For additional complex duct design installation recommendations refer to the manufacturer's installation guide.

B. Mechanical Fastening of Enclosure Material to Ductwork:
   1. Banding: Carbon steel or stainless steel banding is used to hold the outer layer of the blanket enclosure in place. Banding is minimum 1/2 inch (12.7 mm) wide, and is placed
around the entire perimeter of the duct on maximum 10-1/2 inches (267 mm) centers and 1-1/2 inches (38 mm) from each blanket or collar edge.

2. Pinning: To prevent blanket sag on duct spans 24 inch wide (610 mm) or larger, minimum 12-gauge steel insulation pins are welded to the duct along bottom horizontal and outside vertical runs in columns spaced 12 inches (305 mm) apart, 6 to 12 inch (152 to 305 mm) from each edge, and on 10-1/2 inches (267 mm) centers. Pins are also required 1 inch (25 mm) from the end of a duct and 1 inch (25 mm) from any edge near a 90° bend spaced 6 inch (152 mm) apart. Pins are locked in place with 1-1/2 inch (38 mm) diameter or 1-1/2 inch (38 mm) square galvanized steel speed clips or cup head pins. Pins are turned down or the excess cut off to eliminate sharp edges.

C. Through-Penetration Firestop System:
1. When the duct penetrates a concrete or dry wall fire rated floor, ceiling, or wall an approved firestop system shall be employed. Fire-rated insulation shall be installed directly to the duct through the penetration, or terminated on both sides of the penetration depending on the annular space allowance between the duct and the duct opening. When the fire-rated insulation enclosure system is terminated on both sides of the through penetration, the duct wrap material is mechanically attached to the duct at the termination points using either steel banding or steel pins.
2. To fire stop the through penetration void area, fill the annular space between the wrapped duct or bare duct and the periphery of the opening with scrap fire rated insulation firmly packed into the opening. Compress scrap blanket to percentage stated in the firestop listing for a minimum depth as specified in the firestop listing. Recess packing material below surface on both sides of walls or top side only for floors to the depth stated in the firestop listing. Seal over the packing material using an approved firestop sealant to a depth as stated in the firestop listing, flush with top side of a floor assembly and both sides of a wall assembly.

3.04 REPAIR PROCEDURES

A. Repair damaged fire-rated insulation in accordance with manufacturer's instructions.

B. Remove damaged section by cutting the bands and removing the anchor clips holding it in place. Apply a new section of the same dimension ensuring the same overlap and installation method that existed previously. Cut edges and tears in the foil must be taped with aluminum tape to prevent the insulation from wicking moisture or grease.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION
SECTION 230913

INSTRUMENTATION AND CONTROL DEVICES

PART 1 - GENERAL

1.01 WORKED INCLUDED

A. Provide input and output control devices to integrate with direct digital control and building automation system.

B. Furnish instrumentation control devices as an integral part of the Building Automation Section specified in Section 23 09 23.

1.02 RELATED WORK

A. Section 23 05 00: Common Work Results for HVAC

B. Section 23 21 13: HVAC Piping

C. Section 23 31 13: Sheetmetal Ductwork

D. Division 26: Electrical

1.03 SUBMITTAL

A. Submit product data and schedules for all input/output devices.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Provide products and components by manufacturers listed. Where manufacturers are not listed, provide component that complies with specifications.

B. Manufacturers listed must meet performance and material specifications of product or component. Listing of a manufacturer as an acceptable manufacturer does not grant permission to deviate from the specifications.

2.02 INPUT DEVICES

A. General Requirements:
   1. Installation, testing, and calibration of all sensors, transmitters, and other input devices shall be provided to meet the system requirements.

B. Temperature Sensors:
   1. General Requirements:
      a. Sensors and transmitters shall be provided, as outlined in the input/output summary and sequence of operations.
      b. The temperature sensor shall be of the resistance type, and shall be either two-wire 1000 ohm nickel RTD, or two-wire 1000 ohm platinum RTD.
      c. The following point types (and the accuracy of each) are required, and their associated accuracy values include errors associated with the sensor, lead wire, and A to D conversion:
   2. Room Temperature Sensors:
      a. Room sensors shall be constructed for either surface or wall box mounting.
      b. Room sensors shall have the following options when specified:
         1) Setpoint reset slide switch providing a +3 degree (adjustable) range.
2) Individual heating/cooling setpoint slide switches.
3) A momentary override request push button for activation of after-hours operation.
4) Analog thermometer.

3. Room Temperature Sensors with Integral Display:
   a. Room sensors shall be constructed for either surface or wall box mounting.
   b. Room sensors shall have an integral LCD display and four button keypad with the following capabilities:
      1) Display room and outside air temperatures.
      2) Display and adjust room comfort setpoint.
      3) Display and adjust fan operation status.
      4) Timed override request push button with LED status for activation of after-hours operation.
      5) Display controller mode.
      6) Password selectable adjustment of setpoint and override modes.

4. Duct Mount Sensors:
   a. Duct mount sensors shall mount in an electrical box through a hole in the duct, and be positioned so as to be easily accessible for repair or replacement.
   b. Duct sensors shall be insertion type and constructed as a complete assembly, including lock nut and mounting plate.
   c. For outdoor air duct applications, a weatherproof mounting box with weather-proof cover and gasket shall be used.

5. Averaging Sensors:
   a. For ductwork greater in any dimension that 48 inches and/or where air temperature stratification exists, an averaging sensor with multiple sensing points shall be used.
   b. For plenum applications, such as mixed air temperature measurements, a string of sensors mounted across the plenum shall be used to account for stratification and/or air turbulence. The averaging string shall have a minimum of 4 sensing points per 12-foot long segment.
   c. Capillary supports at the sides of the duct shall be provided to support the sensing string.

6. Acceptable Manufacturers: Johnson Controls, Setra, or approved equal.
7. Note: Include others, as appropriate.

C. Power Monitoring Devices:
1. Current Measurement (Amps)
   a. Current measurement shall be by a combination current transformer and a current transducer. The current transformer shall be sized to reduce the full amperage of the monitored circuit to a maximum 5 Amp signal, which will be converted to a 4-20 mA DDC compatible signal for use by the Facility Management System.
   b. Current Transformer - A split core current transformer shall be provided to monitor motor amps.
      1) Operating frequency - 50 - 400 Hz.
      2) Insulation - 0.6 Kv class 10Kv BIL.
      3) UL recognized.
      4) Five amp secondary.
      5) Select current ration as appropriate for application.
      6) Acceptable Manufacturers: Veris Industries or approved equal
   c. Current Transducer - A current to voltage or current to mA transducer shall be provided. The current transducer shall include:
      1) 6X input over amp rating for AC inrushes of up to 120 amps.
      2) Manufactured to UL 1244.
      3) Accuracy: +.5%, Ripple +1%.
      4) Minimum load resistance 30kOhm.
      5) Input 0-20 Amps.
      6) Output 4-20 mA.
D. Refrigerant Leak Detectors:
1. The refrigerant leak detector shall be a standalone device and shall provide a SPDT output to directly energize the refrigeration room exhaust ventilation fans. The detector shall include a sensor or sensors connected to a control panel. Two relay contacts at the control panel shall provide trouble and alarm indication to the Facility Management System. The alarm relay contact shall also directly energize the exhaust fans.
2. The refrigerant leak detector shall sense the type of refrigerant used in the specified chillers. Multiple sensors shall be required to detect different refrigerants and/or provide proper sensing coverage for the area of the refrigeration room.
3. Acceptable Manufacturers: Johnson Controls, MSA Instruments, or approved equal.

E. Smoke Detectors:
1. Ionization type air duct detectors shall be furnished as specified elsewhere in Division 28 for installation under Division 23. All wiring for air duct detectors shall be provided under Division 28, Fire Alarm System. Coordinate interface with BAS and Fire Alarm System.

F. Status and Safety Switches:
1. General Requirements:
   a. Switches shall be provided to monitor equipment status, safety conditions, and generate alarms at the BMS when a failure or abnormal condition occurs. Safety switches shall be provided with two sets of contacts and shall be interlock wired to shut down respective equipment.
2. Current Sensing Switches:
   a. The current sensing switch shall be self-powered with solid-state circuitry and a dry contact output. It shall consist of a current transformer, a solid state current sensing circuit, adjustable trip point, solid state switch, SPDT relay, and an LED indicating the on or off status. A conductor of the load shall be passed through the window of the device. It shall accept over-current up to twice its trip point range.
   b. Current sensing switches shall be used for run status for fans, pumps, and other miscellaneous motor loads.
   c. Current sensing switches shall be calibrated to show a positive run status only when the motor is operating under load. A motor running with a broken belt or coupling shall indicate a negative run status.
   d. Acceptable Manufacturers: Veris Industries, NK Technologies, Johnson Controls or approved equal.
3. Air Filter Status Switches:
   a. Differential pressure switches used to monitor air filter status shall be of the automatic reset type with SPDT contacts rated for 2 amps at 120 VAC.
   b. A complete installation kit shall be provided, including: static pressure tops, tubing, fittings, and air filters.
   c. Provide appropriate scale range and differential adjustment for intended service.
   d. Acceptable Manufacturers: Johnson Controls, Cleveland Controls, or approved equal.

2.03 OUTPUT DEVICES

A. Control Relays:
1. Control Pilot Relays:
   a. Control pilot relays shall be of a modular plug-in design with retaining springs or clips.
   b. Mounting Bases shall be snap-mount.
   c. DPDT, 3PDT, or 4PDT relays shall be provided, as appropriate for application.
3. Ball valves shall be used for hot and chilled water applications, water terminal reheat coils, radiant panels, unit heaters, package air conditioning units, and fan coil units except those described hereinafter.

4. Modulating plug water valves of the single-seat type with equal percentage flow characteristics shall be used for all special applications as indicated on the valve schedule. Valve discs shall be composition type. Valve stems shall be stainless steel.

5. Butterfly valves shall be acceptable for modulating large flow applications greater than modulating plug valves, and for all two-position, open/close applications. In-line and/or three-way butterfly valves shall be heavy-duty pattern with a body rating comparable to the pipe rating, replaceable lining suitable for temperature of system, and a stainless steel vane. Valves for modulating service shall be sized and travel limited to 50 degrees of full open. Valves for isolation service shall be the same as the pipe. Valves in the closed position shall be bubble-tight.

6. Acceptable Manufacturers: Johnson Controls or approved equal

C. Control Valves, Segmented Ball Valves

1. High performance segmented V-Ball control valve: Carbon steel body, stainless steel V-notch ball and shaft, low friction bearings and a low friction graphite ball set.; ANSI Class 150 or 300 flanges as required by application.
2. Rated ANSI Class VI leakage rate, -20 degrees F. to 450 degree F. temperature range and minimum 285 PSI allowable shutoff pressure drop at -20 to 100 F.
3. Rotation: 90 degrees; rangeability: 300 to 1 with equal percentage control characteristic; valve shall accommodate standard electric actuators.
4. Warranty: Valve and linkage, 3 year warranty from date of installation.

D. Electronic Signal Isolation Transducers:
1. A signal isolation transducer shall be provided whenever an analog output signal from the BMS is to be connected to an external control system as an input (such as a chiller control panel), or is to receive as an input signal from a remote system.
2. The signal isolation transducer shall provide ground plane isolation between systems.
3. Signals shall provide optical isolation between systems.
4. Acceptable Manufacturers: Advanced Control Technologies, Phoenix Contact, Johnson Controls or approved equal.

E. External Manual Override Stations:
1. External manual override stations shall provide the following:
   a. An integral HAND/OFF/AUTO switch shall override the controlled device pilot relay.
   b. A status input to the Facility Management System shall indicate whenever the switch is not in the automatic position.
   c. A Status LED shall illuminate whenever the output is ON.
   d. An Override LED shall illuminate whenever the HOA switch is in either the HAND or OFF position.
   e. Contacts shall be rated for a minimum of 1 amp at 24 VAC.

2.04 MISCELLANEOUS DEVICES

A. Local Control Panels:
1. All control panels shall be factory constructed, incorporating the BMS manufacturer's standard designs and layouts. All control panels shall be UL inspected and listed as an assembly and carry a UL 508 label listing compliance. Control panels shall be fully enclosed, with perforated sub-panel, hinged door, and slotted flush latch.
2. In general, the control panels shall consist of the DDC controller(s), display module as specified and indicated on the plans, and I/O devices-such as relays, transducers, and so forth-that are not required to be located external to the control panel due to function. Where specified the display module shall be flush mounted in the panel face unless otherwise noted.
3. All I/O connections on the DDC controller shall be provide via removable or fixed screw terminals.
4. Low and line voltage wiring shall be segregated. All provided terminal strips and wiring shall be UL listed, 300-volt service and provide adequate clearance for field wiring.
5. All wiring shall be neatly installed in plastic trays or tie-wrapped.
6. A convenience 120 VAC duplex receptacle shall be provided in each enclosure, fused on/off power switch, and required transformers.

B. Power Supplies:
1. DC power supplies shall be sized for the connected device load. Total rated load shall not exceed 75% of the rated capacity of the power supply.
2. Input: 120 VAC +10%, 60Hz.
3. Output: 24 VDC.
4. Line Regulation: +0.05% for 10% line change.
5. Load Regulation: +0.05% for 50% load change.
6. Ripple and Noise: 1 mV rms, 5 mV peak to peak.
7. An appropriately sized fuse and fuse block shall be provided and located next to the power supply.
8. A power disconnect switch shall be provided next to the power supply.
C. Thermostats:
   1. Electric room thermostats of the heavy-duty type shall be provided for unit heaters, cabinet unit heaters, and ventilation fans, where required. All these items shall be provided with concealed adjustment. Finish of covers for all room-type instruments shall match and, unless otherwise indicated or specified, covers shall be manufacturer's standard finish.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Actuation / Control Type:
   1. Primary Equipment:
      a. Controls shall be provided by equipment manufacturer as specified herein.
      b. All damper and valve actuation shall be electric.
   2. Air Handling Equipment:
      a. All air handlers shall be controlled with a HVAC-DDC Controller.
      b. All damper actuation shall be electric.

B. HVAC Input Devices - General:
   1. All Input devices shall be installed per the manufacturer recommendation.
   2. Locate components of the BMS in accessible local control panels wherever possible.
      a. The mechanical contractor shall install all in-line devices such as temperature wells, pressure taps, airflow stations, etc.
   4. Duct Temperature Sensors:
      a. Duct mount sensors shall mount in an electrical box through a hole in the duct and be positioned so as to be easily accessible for repair or replacement.
      b. The sensors shall be insertion type and constructed as a complete assembly including lock nut and mounting plate.
      c. For ductwork greater in any dimension than 48 inches or where air temperature stratification exists such as a mixed air plenum, utilize an averaging sensor.
      d. The sensor shall be mounted to suitable supports using factory approved element holders.
   5. Space Sensors:
      a. Mounted per ADA requirements.
      b. Provide lockable tamper-proof covers in public areas and/or where indicated on the plans.

C. HVAC Output Devices:
   1. All output devices shall be installed per the manufacturer's recommendation. The mechanical contractor shall install all in-line devices such as control valves, dampers, airflow stations, pressure wells, etc.
   2. Actuators: All control actuators shall be sized capable of closing against the maximum system shut-off pressure. The actuator shall modulate in a smooth fashion through the entire stroke. When any pneumatic actuator is sequenced with another device, pilot positioners shall be installed to allow for proper sequencing.
   3. Control Dampers: Shall be opposed blade for modulating control of airflow. Parallel blade dampers shall be installed for two position applications.
   4. Control Valves: Shall be sized for proper flow control with equal percentage valve plugs. The maximum pressure drop for water applications shall be 5 PSI. The maximum pressure drop for steam applications shall be 7 PSI.
   5. Electronic Signal Isolation Transducers: Whenever an analog output signal from the Building Management System is to be connected to an external control system as an input (such as a chiller control panel), or is to receive as an input a signal from a remote system, provide a signal isolation transducer. Signal isolation transducer shall provide
ground plane isolation between systems. Signals shall provide optical isolation between systems.

3.02 TRAINING

A. The BMS contractor shall provide the following training services:
   1. One day of on-site orientation by a system technician who is fully knowledgeable of the specific installation details of the project. This orientation shall, at a minimum, consist of a review of the project as-built drawings, the BMS software layout and naming conventions, and a walk through of the facility to identify panel and device locations.

3.03 COMMISSIONING

A. Fully commission all aspects of the Building Management System work.

B. Acceptance Check Sheet:
   1. Prepare a check sheet that includes all points for all functions of the BMS as indicated on the point list included in this specification.
   2. Submit the check sheet to the Engineer for approval.
   3. The Engineer will use the check sheet as the basis for acceptance with the BMS Contractor.

END OF SECTION
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Piping and pipe fittings for:
   1. Chilled Water Piping

1.02 RELATED REQUIREMENTS

A. Section 23 05 00 - Common Work Results for HVAC
B. Section 23 05 23 - General Duty Valves for HVAC
C. Section 23 07 00 - HVAC Insulation

1.03 REFERENCE STANDARDS

C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2011.
F. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.
G. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; 2013.
H. ASME B18.2 - Square, Hex, Heavy Hex, and Askew Head bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws; 2013.
J. ASME B31.3 - Process Piping; 2012.
K. ASME B31.9 - Building Services Piping; 2014 (ANSI/ASME B31.9).
Q. ASTM A194 - Standard Specification for Carbon and Alloy Steel Nuts for bolts for High Pressure or High Temperature Service, or Both; 2014.


1.04 SUBMITTALS

A. Submit product data for review on piping and fittings. Submittal data shall include:
   1. Manufacturer of pipe.
   2. Tests or listings by recognized testing laboratory that certifies material composition is in accordance with ANSI/ASTM requirements.
   3. Product data for pipe and fittings to be used on each piping system.
   5. Solder and brazing product data and installation procedures for copper pipe.

PART 2 - PRODUCTS

2.01 STEEL PIPE

A. Black Steel: Electric resistance welded or seamless, ASTM A53 or ASTM A106 Grade B. Mill wrap uninsulated underground steel pipe with Republic X-Tru-Coat or equal.
   1. Through 10” standard weight Schedule 40

B. Provide for the following services:

C. Schedule 40, A53 or A106 galvanized pipe for:
   1. Cooling Coil condensate drain piping. (Contractor option: Copper; see "COPPER PIPE" below.)
   2. Drain piping from equipment 1-1/2” diameter and smaller.

2.02 STEEL PIPE FITTINGS

A. Flanges, Fittings, and Unions: Mark in accordance with MSS-SP-25.
B. Fittings:
   1. 2-1/2" and larger: Class 150 wrought steel, butt welded fittings, ASME B16.9
   2. 2" and Smaller
      a. Water Service: Class 150, malleable iron, screwed.

C. Unions, 2" and smaller: Material as specified under fittings, screwed with brass seat.

D. Branch connections from mains or headers, 2-1/2" and larger: Welded tees or welding outlets, Bonney Forge Weldolets or Threadolets. Use forged outlets only if branch line is at least one pipe size smaller than main or header.

E. Galvanized steel pipe fittings: Same as above, except galvanized coated.
   1. Provide drainage pattern type fittings for drain piping.

F. Thread Lubricant: Similar to Crane "Formula 425".

2.03 COPPER PIPE

A. Conform to ASTM B-88 Specification for wrought seamless copper.

B. Type L, hard for:

C. Type M, hard for:
   1. For non-pressurized drain piping.
   2. Fan coil unit condensate piping.
   3. Cooling coil condensate piping.

2.04 COPPER PIPE FITTINGS

A. Sweat type, wrought copper, ASTM B62, with dimensions conforming to ASTM/ANSI B16.22 and sweep patterns for copper tubing.

B. Dielectric Connections:
   1. Provide at junction of copper pipe and equipment with steel piping systems.
   2. Central, dielectric insulating unions, and insulating flange unions, as manufactured by Central Plastic Company or CTS Fabrication USA (1-1/2" thru 8").
   3. Provide copper solder joint to plated female iron pipe for sizes 1/2" through 2".
   4. Provide insulating flange unions, malleable female iron pipe thread to copper solder joint flange unions for sizes 2-1/2" through 4".
   5. Brass fittings and valves may not be used for dielectric union locations.

C. Unions: Brass ground joint, 250 lb. working pressure.

D. Nipples: Brass

2.05 MISCELLANEOUS PIPE ACCESSORIES

A. Escutcheons: Chrome pipe escutcheons, slip-on or split type where pipe passing through finished walls or ceiling may be visible.

B. Exposed Metal Pipe and Trim: Chrome-plated.

C. Control System Connectors: Crane No. 386, 1" steel half couplings, or 1" female pipe thread connectors.

D. Install 18-gauge sheetmetal or galvanized steel pipe saddles to protect insulation.
PART 3 - EXECUTION

3.01 INSTALLATION

A. Clean inside of pipe before installation. Keep installed piping clean, and protect ends from foreign matter by capping or plugging them.

B. Install pipe so that it does not interfere with opening of doors or apparatus, access to equipment, or to electrical equipment.

C. Run pipes in straight lines and square with building. Install risers plumb. Make offsets only where indicated and where necessary.

D. Do not install piping above electrical equipment such as starters, variable frequency drives, motor control centers, or disconnects. Maintain code required clearance above, below and to sides of electrical equipment.

E. Provide flanges or unions throughout the pipe systems at all equipment. Make provisions for servicing and removal of equipment without dismantling piping.

F. In so far as possible, drainage piping shall not be installed overhead, whether exposed or above ceiling, in operating rooms, delivery rooms, nurseries, food preparation or serving areas, or in rooms listed above. Where unavoidable, provide drain troughs or other means to carry away leakage.
   1. Grading Pipes for Drainage:
      a. Slope cooling coil condensate drains at 1/8" per foot.

G. Branch Lines:
   1. Where possible branch lines shall come off top of mains to prevent sediment, welding slag, or pipe burrs from entering the branch lines and causing valve leakage or failure.

3.02 PIPE JOINTING

A. Preparing Pipe Ends:
   2. Ream pipe ends, after cutting, to full diameter.
   3. Where pipe is to be threaded, secure pipe in pipe stand, die cut, full depth, right hand threads. Threads to be taper type.
   4. All threaded pipe joints to have suitable pipe sealant applied to threads prior to assembly of joint. Joints shall be leak proof.
   5. Where pipe is to be welded, die-cut end of butt joints at 30 degree taper. Weld should have a full penetration with no bubbles or holes. Remove all slag.

B. Welded Steel Piping:
   1. Where welded piping is specified, make welds by oxy-acetylene process or electric process in accordance with ASME/ANSI B31.1.
      a. Welding Rods: Grade recommended for purpose by manufacturer's and identification.
   2. Line welds, single V-butt type:
      a. Mill or machine bevel pipe at 37 1/2 degrees to within 1/16" of inside wall, except that in field limited amount of pipe may be flame beveled.
      b. Pipe with a wall thickness of 3/16" or less need not be beveled but may be welded by melting down into building up over abutting ends.
      c. Separate abutting ends of joints before welding to permit complete fusion to bottom without overlapping.
      d. Tack in two or more points to maintain alignment, and fusion weld.
Make all welds of sound weld metal, thoroughly fused into ends of pipe, and to bottom of vee.
   a. Build in excess of pipe wall to give reinforcement to one fourth pipe wall thickness.
   b. Weld metal shall present a gradual increase in thickness from surface of pipe to center of weld.
   c. Minimum weld width: Two and one half times thickness of pipe wall.

Use welding ells at turns in welded lines

Do not weld pipe couplings in place of welding fittings for any branch connections.

Weld-o-lets and thread-o-lets:
   a. Scribe and cut openings in main pipes for welded branches accurately taking care to remove all of plugs and cuttings from main pipe.
   b. Full weld fillet welds for full depth of fillet, with additional beads to form well rounded connection as recommended by weld-o-let manufacturer.

Cut openings into pipe for welded connections accurately to give matched intersections.

Make welded fittings of same material with same pressure and temperature rating as pipe with which they are used.

Make flanged connections to control valves, pump suction and specialties with ANSI standard welding neck flanges. All other flange connections may be made with slip-on flanges provided they are seal welded on inside.

Fuse all fillet welds for flanges or fittings into pipe and plate for minimum distance of 1-1/2 times pipe wall thickness and depth weld on 1-1/4 times pipe wall thickness.

C. Soldered and Brazed Joints:
   1. Make Type L and M copper pipe joints with suitable flux and 95/5, lead free solder.

D. Bracing Joints:
   1. Provide braces and bridle rods as required to reinforce joints.
   2. If mechanical lock type couplings are used, then prepare pipe ends and make joints in accordance with pipe coupling manufacturer's printed instructions.

3.03 ESCUTCHEONS

   A. Provide chrome-plated escutcheons where uninsulated pipes penetrate walls or ceilings of finished spaces.

3.04 AIR VENTING

   A. Provide manually operated air vents at high points in vertical risers and at water coils to eliminate air from systems. Air vents are not required at reheat coils.

   B. Use ball valves for manual air vents.

3.05 VALVE ACCESS

   A. Locate ceiling/wall access panels at shut-off and control valves for proper access and operation. Furnish and install access doors in accordance with Section 23 05 00 and other Divisions as applicable.

3.06 CONTROL SYSTEM CONNECTORS

   A. Weld connectors at points indicated, and at other points where necessary for installation of thermometers, sensors, and automatic controls.

3.07 TESTING

   A. Before piping is concealed or insulated, recheck it for leaks.
B. Rework or replace defective and leaking joints, and joints which are otherwise unsatisfactory. Peening, caulking, and doping are not permitted.

END OF SECTION
SECTION 232300
REFRIGERATION PIPING SYSTEM

PART 1 - GENERAL
1.01 WORK INCLUDED
   A. Piping, valves and fittings for refrigerant piping systems shown on drawings.

1.02 RELATED WORK
   A. Section 23 05 00: Common Work Results for HVAC
   B. Section 23 05 29: Pipe Hangers
   C. Section 23 07 00: HVAC Insulation

1.03 SAFETY CODE
   A. Comply with the requirements of ANSI B9.1, Code for Refrigerant Systems.

1.04 SUBMITTALS
   A. Submit for review manufacturer's product data for refrigerant piping system components.

PART 2 - PRODUCTS
2.01 MATERIALS
   A. Piping: Type "L" ACR hard copper, ASTM B280.
   B. Fittings: Wrought copper.
   C. Solder: Silver solder, or phos-copper solder having a melting point of 1125 degrees F or higher.
   D. Service Valves: Henry Valves, Mueller Industries, C&D Valve, or approved equal. Provide packed type receiver, purge, and gauge valves with valve stem seal cap parts.
      1. Valves up to 5/8" OD: Henry Figure 516 or approved equal, diaphragm type
      2. Valves larger than 5/8" OD: Henry Figure 203 or approved equal
   E. Solenoid Valves: Sporlan Co., Danfoss, or approved equal, suitable for the type of refrigerant used, and of a type permitting manual lifting of stem for emergency operation. Size valves for pressure drop of 2 pounds with R-12 refrigerant, and a 3 pound drop with R-22 refrigerant, at design flow.
   F. Refrigerant Filter Dehydrator and Moisture Indicator:
      1. Dehydrator: Sporlan Co. "Catch-All", Danfoss, or approved equal with replaceable core type, of size recommended by manufacturer for maximum design tonnage.
      2. Moisture Indicator: Sporlan Co. "See-All, Type SA-125, Danforth or approved equal.
   G. Pipe Supports:
      1. Pipes subject to vibration: Isolation type brackets
      2. Pipes not subject to vibration: Anvil No. CT-95, Hilti, Caddy or approved equal
      3. Riser Clamps: Anvil CT-121, Hilti, Caddy or approved equal
   H. Escutcheons: Chrome-plated escutcheons sized for pipe.
PART 3 - EXECUTION

3.01 INSTALLATION

A. Make solder joints with carbon dioxide or nitrogen passing through joints being soldered. Insure a clean, tight system. Pull a clean rag through each piece of tubing after cutting or reaming.

B. Install pipe and hangers in accordance with hanger manufacturer's printed instructions.

3.02 LEAK TESTING

A. Test for leaks by use of carbon dioxide or nitrogen and a liquid soapsuds solution. Correct leaks found.

B. Evacuate system to 20" vacuum and charge with refrigerant until a pressure of 15 psig is reached. Then test for leaks using a Halide leak detector. Correct leaks found.

C. Pressurize system, with carbon dioxide or nitrogen, to 300 psig on the high side, and 200 psig on the low side, and test for leaks. Correct leaks found.

3.03 SYSTEM DEHYDRATION

A. Dehydrate system by "Double Dehydration" method.

B. Use a suitable vacuum pump. Evacuate system to a vacuum of 0.2" Hg absolute and operate pump for eight hours when that pressure is reached.

C. After eight hours, admit dry nitrogen directly to the system, and then evacuate system to a vacuum of 0.2" Hg absolute and operate pump for four hours.

3.04 CHARGING SYSTEM

A. When system dehydration is complete and all leaks are corrected, charge system with refrigerant.

3.05 SAFETY CODE

A. System shall be in accordance with ANSI B9.1 Code for Refrigeration Systems.

END OF SECTION
SECTION 233113
SHEETMETAL DUCTWORK

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide an installed duct system which will supply the air quantities indicated by the drawings and have the lowest possible friction loss with the least possible leakage loss. System static pressure loss for each system shall not exceed that which is indicated in the equipment schedule as external static pressure or in the fan schedule as static pressure and shall include the losses of all accessories. Friction losses shall be minimized by reduction in the number of offsets and elbows by pre-planning the duct system installation and coordination with other trades to prevent interferences. Maintain access to accessories requiring maintenance, service, and inspection. Radius elbows are preferred for turns to minimize friction, noise, and vibrations; and, especially, for sections having large volume or higher velocities and sections which may have turbulence.

B. Provide and/or construct materials, ductwork, joints, transformations, splitters, dampers, and access doors as specified herein for the sheet metal ductwork as shown on drawings.

1.02 QUALITY CONTROL AND REGULATORY STANDARDS

A. SMACNA Manual: Sheet Metal Tradesman shall have access on the construction site to "HVAC Duct Construction Standards, Metal and Flexible, Second Edition -1995 with Addendum No. 1 November 1997". Comply with applicable provisions of the SMACNA Manual and more stringent requirements of this specification.

B. Quality control involves not only the general performance requirements for air ducts, but also quality workmanship which includes layout preplanning so that offsets, rises, falls, elbows, fittings, etc., are minimized or eliminated. General performance requirements for ducts include:

1. Dimensional stability (shape deformation and strength)
2. Containment of the air being conveyed (leakage control). (See Part 3 of this specification for leakage testing)
3. Vibration (fatigue and appearance)
4. Noise (generation, transmission, or attenuation)
5. Exposure (to damage, weather, temperature extremes, flexure cycles, wind, corrosive atmospheres, biological contamination, flow interruption or reversal, underground or other encasement conditions, combustion, or other in-service conditions)
6. Support (alignment and position retention)
7. Thermal conductivity (heat gain or loss and condensation control)

C. Provide galvanized duct materials which meet applicable requirements of local and state codes, whichever is the most stringent.

D. Support ductwork in accordance with applicable requirements of local and state codes and details on drawings.

E. Emboss fittings with material gauge, manufacturer, and type material.

F. Sealers, liners, pre-insulated jackets and flexible ducts shall comply with a flame spread rating of 25 or less and a smoke developed rating of not over 50.

1.03 SUBMITTALS AND SHOP DRAWINGS

A. Submit material/product data as described in Division 01.
B. Certifications: Provide a duct schedule, certified by an officer of the sheet metal fabrication subcontractor, that the ductwork conforms to SMACNA standards, and for each sheet metal system furnished on the project include:
1. System name
2. Duct material
3. Duct gauge
4. SMACNA rectangular reinforcement number
5. SMACNA intermediate reinforcement number
6. SMACNA transverse reinforcement number
7. Rod diameter and type
8. Sealant type
9. Attachment method
10. Duct system design pressure

1.04 RELATED WORK
A. Section 23 05 00: Common Work Results for HVAC
B. Section 23 05 93: HVAC Systems Test and Balance
C. Section 23 07 00: HVAC Insulation
D. Section 23 33 00: Air Duct Accessories

PART 2 - PRODUCTS

2.01 MATERIAL
A. Sheet metal ductwork, angles, bar slips, hangers, and straps: Galvanized, prime quality steel sheets.
B. Screws: Cadmium-plated.
C. Joint Sealers: Hardcast RTA-50, consisting of two parts, mineral impregnated woven fiber tape and plastic type activator/adhesive.
D. Sheetmetal Accessories: As specified in Section 23 33 00.

2.02 PRESSURE CLASSIFICATION
A. Ductwork where maximum dimension is less than 97” shall be constructed based on applicable pressure classification in accordance with SMACNA Manual including sheetmetal gauge, reinforcement gauge and spacing.
B. Construct the following for 1" pressure classification, Table 1- 4.
   1. Supply ductwork downstream of terminal boxes
   2. Low pressure supply ductwork to reheat coils
   3. Low pressure supply and return ductwork at fan coil units
C. Construct the following for 2" pressure classification, Table 1- 5.
   1. Return ductwork
   2. Exhaust ductwork
   3. Make-up air ductwork
2.03 RECTANGULAR DUCTWORK

A. Transverse Joints:
   1. "S" and drive construction for 1" and 2" pressure classification.
      a. Provide duct gauge and reinforcing angles in accordance with Table 1-11.
   2. Duct Connection System: Connection system as manufactured by Ductmate or Nexus shall incorporate gasketed joints, metal cleats and bolted corners. Minimum metal gauge shall be 24-gauge. Connection systems may be used for all pressure classifications.
   3. For pressure classifications above 2", use double "S" joint up to 30" and companion angle or manufacturer's connection system above 30".

B. Longitudinal Seams: Pittsburg Lock

C. Transitions:
   1. Do not exceed 1" in 7" of slope for increase-in-area transitions.
   2. Do not exceed 1" in 4" of slope for decrease-in-area transitions, 1" in 7" is preferable.
   3. Do not exceed 45 degrees on the entering or leaving side for angle of transitions at connections to equipment without the use of approved vanes.

D. Elbows:
   1. Fabricate ells using one of the following specifications: The fabrication methods are listed in order of preference. Use radius elbows where ever possible. Use square elbows only when available space prevents the use of radius elbows.
      a. Unvaned, long radius elbow with the throat radius equal to 3/4 of the width of the duct and with a full heel radius.
      b. Six inch throat radius with full radius, single thickness vanes and full heel radius. Maximum unsupported length of vanes shall be 36". Securely fasten vanes to runners. Secure vanes in stable position. Construct vane edges to project tangents parallel to duct sides.
      c. Square elbows with airfoil, double thickness turning vanes.
   2. Turning Vanes:
      a. True airfoil design; smoothly-rounded entry nose with extended trailing edge. Generated sound power level shall not exceed 54 decibels in band 4 at 2000 FPM in a 24"x24" duct.
      b. Acceptable Manufacturers: Aero/Dyne Company or approved equal, High Efficiency Profile, HEP. Contact Aero/Dyne Company at 19 Saint John Blvd., Englewood, FL (Telephone #800-522-2423) (www.aero-dyne.net), Ductmate or approved equal.
      c. Fabricate assemblies with Aero/Dyne Company side rails; install vanes on design centers of 2.4 inches across the full diagonal dimension of the elbow.
      d. Submit Aero-Dyne product and performance data for review.
         1) As a possible VE substitution only, submit, for owner and engineer review, proposed alternate vane manufacturer's data including independent performance test data for pressure loss and generated sound power levels. Generally, alternate vanes, including SMACNA shop vanes, will not be accepted unless performance and generated sound power levels meet or exceed the Aero-Dyne vane.

E. Branch Connections:
   1. Pressure classification 2" and less:
      a. Rectangular branch from rectangular main: 45 degree entry with all corners closed as shown in Figure 2-8
      b. Round branches: Spin-in fitting without scoop.
      c. Parallel flow branches: See Figure 2-7.
      d. Space duct joints to avoid cutting them for branch take offs and outlet collars.
F. Duct Sealing:
   1. All longitudinal and transverse joints, seams and duct sidewall penetrations, regardless of
      pressure classification, shall be sealed with duct sealer. Follow SMACNA Table 1-2, Seal
      Class A for all supply, return and exhaust ductwork.

PART 3 - EXECUTION

3.01 INSTALLATION, APPLICATION, ERECTION

   A. Do not exceed 45 degrees for easement transition angle.

   B. Seal all transverse and longitudinal joints and seams and duct wall penetrations with approved
      sealer in accordance with manufacturer's directions.

   C. Counterflashing: Counterflash ductwork penetrating roof.

   D. Support round ducts from building structure with galvanized steel hangers in accordance with
      SMACNA. Secure hangers to masonry portion of building by means of inserts or other acceptable
      anchors.

   E. Secure hangers to steel structure members by means of C-clamps. Vertical risers, and other duct
      runs where methods of support specified above are not applicable, shall be supported by angle
      brackets as shown in SMACNA Manual.

   F. Where appropriate based on duct weight, support rectangular ducts by minimum, 1" x 18-gauge,
      galvanized band iron or minimum 3/8" galvanized rod hangers attached to reinforcing angles and
      spaced same as reinforcing angles. Design hangers, reinforcing angles and other components to
      support weight of duct and insulation. Secure hangers to concrete beam or slab by adequately
      sized inserts, anchor shield and bolt, toggle bolt, or expansion bolt.

   G. Attach hangers to ductwork using sheet metal screws.

   H. Space hangers approximately 8' along the duct for ducts under 60". Ducts over 60" and larger,
      and heavier sections such as welded duct and sound absorbers, space hangers at approximately
      4' intervals.

   I. Hangers and bracing used with ductwork shall be galvanized.

   J. Support sound absorbers by inserts in the slab.

   K. Provide smooth insulation finish around damper operating quadrants, splitter adjusting clamps,
      access doors, and similar operating devices. Provide metal collar equivalent in depth to insulation
      thickness.

3.02 CLEANING

   A. Clean mechanical system thoroughly to assure all foreign matter and dirt is removed.

3.03 LEAKAGE TESTING OF INSTALLED SYSTEMS

   A. Test duct for leakage in accordance with "System Pressure Testing for Leaks", published by
      McGill Airflow Corporation. Use prescribed test kit containing test blower, two U-tube manometers
      and calibrated curve attached to the orifice tube assembly.

   B. Pressurize installed duct system to maximum pressure for fabrication classification. Total
      allowable leakage shall not exceed one percent of air handling capacity of system. If system is
tested in sections, add leakage rates for individual sections to determine leakage for the whole system.

C. Correct leaks found in excess of allowable limits. Retest.

D. Have test results available for review on a progressive and final basis. Include test results in project closing file.

E. Testing in accordance with printed procedure.

3.04 AIR TEST AND BALANCE

A. Prepare the system for tests as specified in Section 23 05 93 and correct deficiencies found by the Test and Balance firm.

B. Duct dimensions shown on drawings indicate inside clear dimensions. Make allowances for duct requiring internal sound lining, or insulation to provide "inside clear" (IC) dimensions.

C. In addition to the requirements above, add supplemental bracing as necessary to prevent sagging and drumming, and/or vibration.

END OF SECTION
SECTION 233300
AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.01 WORK INCLUDED
   A. Air distribution registers, grilles, and diffusers
   B. Fire dampers
   C. Smoke dampers
   D. Combination fire and smoke dampers
   E. Access doors

1.02 RELATED WORK
   A. Section 23 09 23: Building Automation and Direct Digital Controls
   B. Section 23 31 13: Sheetmetal Ductwork
   C. Section 23 31 14: Sheetmetal - Special Ductwork

1.03 QUALITY CONTROL
   A. Air diffusers, grilles, and registers: Ratings certified by Air Diffusion Council.
   B. Fire Dampers: Comply with requirements of UL 555, NFPA 90A and NFPA 90B.
   C. Smoke and Combination Fire/Smoke Dampers: Comply with requirements of UL 555S.
   D. Roof Ceiling Assembly: Comply with requirements of UL Fire Resistance Index.

1.04 SUBMITTALS
   A. Submit manufacturer's product data for review.

PART 2 - PRODUCTS

2.01 REGISTERS, GRILLES AND DIFFUSERS
   B. Sidewall Supply Registers: Titus, Model 300-FL with OBD, plaster frame Extruded aluminum, removable core, opposed blade damper with baked-on, off-white enamel finish.

2.02 FIRE AND SMOKE DAMPERS
   A. Acceptable Manufacturers:
      1. Ruskin
      2. Air Balance
      3. Greenheck
B. Damper Fire Ratings: See drawings for fire-ratings of walls and floors in which dampers are installed. Coordinate damper fire-rating with wall and floor rating. Dampers with asbestos paper or coating are unacceptable.

C. Fusible Link: Provide fusible links which will melt at 165, 212 degrees causing damper to close and lock in closed position.

D. Provide type "C" multi-leaf fire dampers rated for use in dynamic systems with airflow up to 4000 fpm at 6" w.c. Construct dampers of steel with rust resistant finish.

E. Smoke Dampers:
   1. Low pressure duct (2" pressure class and lower): Ruskin SD-35.
   2. Install and mount qualified operator at time of fabrication by damper manufacturer. Operator shall be mounted out of airstream in accessible location. Furnish damper and operator by a single entity meeting applicable UL 555S qualifications for both damper and operator. Damper operator shall be of adequate size to open or close damper in 15 seconds.

F. Combination Fire and Smoke Dampers:
   1. Low pressure ductwork: Ruskin Model FSD-36
   3. Install and mount qualified operator at time of fabrication by damper manufacturer. Furnish damper and operator by a single entity meeting applicable UL 555S qualifications for both damper and operator. Damper operator shall be of adequate size to open or close damper in 15 seconds.

G. Sleeves:
   1. Unless otherwise required by the authority having jurisdiction, sleeves for fire dampers and fire and smoke combination dampers shall be the rigid type of construction recommended in Schedule 2 of SMACNA Publication for "Fire Damper and Heat Stop Guide for Air Handling Systems". Use 16 gauge for ducts 24" or less in diameter or either rectangular dimension and 14 for ducts over 24". Provide minimum 18" long sleeves. Coordinate required length with wall thicknesses.
   2. Conform to the requirements of UL 555S. Test damper and operator as a unit to comply with UL 555S.
   3. Install 1-1/2"x1-1/2"x1/8" angle bar on four sides of sleeves and both sides of wall.
   4. Fasten angles to sleeve only.
   5. Do not fasten angles to the wall.

H. Maximum pressure drop for combination fire/smoke dampers:
   1. Supply ducts: 0.25" at 2500 FPM
   2. Return and exhaust ducts: 0.15 at 1500 FPM

2.03 ACCESS DOORS

A. Acceptable Manufacturers:
   1. Ruskin, Model ADH22
   2. Venco CAD-10 or approved equal.

B. Provide insulated doors in ductwork for access to service equipment such as automatic dampers, fire dampers, smoke dampers, humidifiers duct coils (each side), casing mounted coils (each side), filters (each side), duct mounted smoke detectors duct mounted air flow measuring stations (each side) and elsewhere as noted on drawings.

C. Size access doors as follows:
   1. Duct Sizes under 12": Door sized sufficient to service equipment or replace fusible link
   2. Duct sizes 12" to 20": 12"x12" door
3. Duct sizes 20" to 36": 18"x18" door
4. Duct sizes 36" and above: 24"x24" door

D. In accordance with NFPA 90A, identify each access door with 1/2" high stenciled letters as 'Fire Damper', 'Smoke Damper', or 'Combination Fire/Smoke Damper'.

2.04 MANUAL VOLUME DAMPERS

A. Type: Opposed blade.

B. Material: Steel, 3V type blades mounted in steel channel frame.

C. Shaft: 1/2" square rod operator with end bearings and gasket seal at duct penetrations. Terminate shaft in damper frame with bushings.

D. Operator: Locking quadrant handle with damper position indicator and insulation standoff mounting bracket for externally insulated ductwork.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install sheet metal accessories in locations shown on drawings.

B. Install accessories in accordance with manufacturer's published recommendations, as well as, applicable sections of SMACNA Manual and other standards set forth in Part 1.

C. Provide all screws, bolts, nuts, inserts, and material required for attaching sheet metal to duct, walls, floors, and ceilings.

D. Where diffusers or grilles and registers are not provided with volume dampers, install spin-in fitting with balancing damper in duct runout.

3.02 TESTING

A. Check work for satisfactory installation and performance.

B. Insure that adequate access does in fact exist for fire and smoke dampers and that damper operator motors are not hindered in operation by proximity to walls or other objects.

C. Check duct connections at access doors for air leakage or condensation. Correct conditions found.

END OF SECTION
SECTION 236213

PACKAGED AIR-COOLED REFRIGERANT COMPRESSOR AND CONDENSER UNIT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Condensing unit package.
B. Charge of refrigerant and oil.
C. Controls and control connections.
D. Refrigerant piping connections.
E. Motor starters.
F. Electrical power connections.

1.02 RELATED REQUIREMENTS

A. Section 23 05 13 - Common Motor Requirements for HVAC Equipment.
B. Section 23 05 48 - Vibration Isolation
C. Section 26 28 16 - Enclosed Switches

1.03 PERFORMANCE REQUIREMENTS

A. Provide equipment and capacities as scheduled on the drawings.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures and requirements.
B. Product Data: Provide rated capacities, weights specialties and accessories, electrical nameplate data, and wiring diagrams. Include equipment served by condensing units in submittal, or submit at same time, to ensure capacities are complementary.
C. Sustainable Design Documentation: Submit manufacturer's product data on refrigerant used, showing compliance with specified requirements.
D. Shop Drawings: Indicate components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections. Include schematic layouts showing condensing units, cooling coils, refrigerant piping, and accessories required for complete system.
E. Design Data: Indicate pipe and equipment sizing.
F. Manufacturer's Instructions: Submit manufacturers complete installation instructions.
G. Operation and Maintenance Data: Include start-up instructions, maintenance instructions, parts lists, controls, and accessories.
H. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Lubricating Oil: One complete change.

1.05 QUALITY ASSURANCE
   A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc.
      as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

1.07 WARRANTY
   A. See Section 01 78 21 - Closeout Submittals, for additional warranty requirements.
   B. Provide a five year warranty to include coverage for refrigerant compressors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS
   D. Diakin.
   E. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MANUFACTURED UNITS
   A. Units: Self-contained, packaged, factory assembled and pre-wired units suitable for outdoor use
      consisting of cabinet, compressors, condensing coil and fans, integral sub-cooling coil, controls,
      liquid receiver, wind deflector, and screens.
   B. Construction and Ratings: In accordance with AHRI 210/240. Test in accordance with ASHRAE
      Std 23.
   C. Performance Ratings: Energy Efficiency Rating (EER) and Coefficient of Performance (COP) not
      less than prescribed by ASHRAE Std 90.1.
   D. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global
      warming potential (GWP) of less than 50.

2.03 CASING
   A. House components in welded steel frame with galvanized steel panels with weather resistant,
      baked enamel finish.
   B. Mount starters, disconnects, and controls in weatherproof panel provided with full opening access
      doors. Provide mechanical interlock to disconnect power when door is opened.
   C. Provide removable access doors or panels with quick fasteners and piano hinges.
2.04 CONDENSER COILS

A. Coils: Aluminum fins mechanically bonded to seamless copper tubing. Provide sub-cooling circuits. Air test under water to 425 psig, and vacuum dehydrate. Seal with holding charge of nitrogen.

2.05 FANS AND MOTORS

A. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge. Equip with roller or ball bearings with grease fittings extended to outside of casing.

B. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor or 3 phase, with permanent lubricated ball bearings and built in current and thermal overload protection. Refer to Section 23 05 13.

2.06 COMPRESSORS

A. Compressor: Semi-hermetic reciprocating type.

B. Mounting: Statically and dynamically balance rotating parts and mount on spring vibration isolators. Internally isolate hermetic units on springs. Refer to Section 23 05 48.

C. Lubrication System: Reversible, positive displacement oil pump with oil charging valve, oil level sight glass, and magnetic plug or strainer.

D. Motor: Constant speed 1800 rpm suction gas cooled with electronic sensor and winding over temperature protection, designed for across-the-line starting. Refer to Section 22 05 13. Furnish with starter.

E. Capacity Reduction Equipment: Suction valve unloaders, with lifting mechanism operated by electrically actuated solenoid valve, with unloaded compressor start; controlled from suction pressure.

F. Sump Oil Heater: Evaporates refrigerant returning to sump during shut down. Energize heater continuously when compressor is not operating.

2.07 REFRIGERANT CIRCUIT

A. Provide each unit with one refrigerant circuit, factory supplied and piped. Refer to Section 23 23 00.

B. For each refrigerant circuit, provide:
   1. Filter dryer replaceable core type.
   2. Liquid line sight glass and moisture indicator.
   3. Thermal expansion valve for maximum operating pressure.
   4. Insulated suction line.
   5. Suction and liquid line service valves and gage ports.
   6. Liquid line solenoid valve.
   7. Charging valve.
   8. Discharge line check valve.
   9. Compressor discharge service valve.
   10. Condenser pressure relief valve.
2.08 CONTROLS

A. On unit, mount weatherproof steel control panel, NEMA 250, containing power and control wiring, molded case disconnect switch, factory wired with single point power connection. Factory mount disconnect switch on unit under provisions of Section 26 28 16.

B. For each compressor, provide across-the-line starter, non-recycling compressor overload, starter relay, and control power transformer or terminal for controls power. Provide manual reset current overload protection. For each condenser fan, provide across-the-line starter with starter relay.

C. Provide safety controls arranged so any one will shut down machine:
   1. High discharge pressure switch (manual reset) for each compressor.
   2. Low suction pressure switch (automatic reset) for each compressor.
   3. Oil Pressure switch (manual reset).

D. Provide the following operating controls:
   1. Thermostat located in room cycles compressors activates cylinder unloaders.
   2. One minute off timer prevents compressor from short cycling.
   3. Low ambient temperature controls.
   4. Low ambient thermostat to lock out compressor at low ambient temperatures.

E. Provide controls to permit operation down to 0 degrees F ambient temperature.
   1. Thermostat to cycle fan motors in response to outdoor ambient temperature.
   2. Head pressure switch to cycle fan motors in response to refrigerant condensing pressure.
   3. Solid state control to vary speed of one condenser fan motor in response to refrigerant condensing pressure.
   4. Electronic control consisting of mixing damper assembly, controlled to maintain constant refrigerant condensing pressure.

F. Gages: Pre-piped for suction and discharge refrigerant pressures and oil pressure for each compressor.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's installation instructions.

B. Complete structural, mechanical, and electrical connections in accordance with manufacturer's installation instructions.

C. Provide for connection to electrical service. Refer to Section 26 28 16.

D. Provide connection to refrigeration piping system and evaporators. Refer to Section 23 23 00. Comply with ASHRAE Std 15.

3.02 SYSTEM STARTUP

A. Supply initial charge of refrigerant and oil for each refrigeration system. Replace losses of oil or refrigerant prior to end of correction period.

B. Charge system with refrigerant and test entire system for leaks after completion of installation. Repair leaks, put system into operation, and test equipment performance.
C. Shut-down system if initial start-up and testing takes place in winter and machines are to remain inoperative. Repeat start-up and testing operation at beginning of first cooling season.

D. Provide cooling season start-up, and winter season shut-down for first year of operation.

END OF SECTION
SECTION 236313
AIR COOLED CONDENSING UNITS

PART 1 - GENERAL

1.01 WORK INCLUDED
   A. Provide condensing units as scheduled on drawings and as specified herein.

1.02 RELATED WORK
   A. Section 23 05 48: Vibration Isolation
   B. Section 23 07 00: HVAC Insulation
   C. Section 23 23 00: Refrigerant Piping System

1.03 SUBMITTALS
   A. Submit product data to Designer for approval.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
   A. Mistubishi
   B. Trane
   C. Daikin

2.02 EQUIPMENT
   A. Safety Controls: High and low pressure stats, compressor thermal cutouts, short cycling prevention timer, and 115 volt transformer for control circuit.
   B. Warrant motor and compressors against failure for a period of five (5) years after start up.
   C. Units 20 Tons and Larger: Include oil safety pressure switches.
   D. Wire units with multiple compressors to stop-start the compressors in sequence, to prevent all starting at once. Units shall be fully automatic, factory pre-wired including motor starters, ready for operation.
   E. Units shall be weather-proofed for outdoor installation.

2.03 UNITS FIVE TONS AND SMALLER
   A. Units shall be air-cooled condensing units complete with welded hermetic reciprocating compressor thermal and current cutouts.
   B. Unit shall include an air cooled condenser section, complete with condensing head pressure control, winter start control, and other controls necessary for satisfactory operation at the outside temperature specified.
   C. Motor-compressors shall be warranted against failure for a period of five (5) years after start up.
2.04 UNITS FIVE TONS AND ABOVE

A. Air-cooled condensing units complete with serviceable hermetic reciprocating compressor, air-cooled condenser, with condensing head pressure control, winter start controls, and other controls necessary for satisfactory operation at the outside temperatures specified.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install condensing units as detailed on drawings and in accordance with manufacturer's instructions.

B. Demonstrate to and instruct operating personnel in the operation and maintenance of the system.

C. Start-up and test unit for proper operation.

D. Install refrigerant piping as detailed on drawings and in accordance with manufacturer's recommendations.

END OF SECTION
SECTION 238126
SPLIT SYSTEM A/C UNITS

PART 1 - GENERAL

1.01 RELATED WORK
   A. Section 23 07 00: HVAC Insulation
   B. Section 23 23 00: Refrigeration Piping System
   C. Division 26: Electrical

1.02 SUBMITTALS
   A. Submit items for review.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
   A. Trane
   B. Carrier
   C. Mitsubishi

2.02 A/C UNIT WITH ELECTRIC HEAT
   A. Outdoor Unit:
      1. Refrigerant: R-410A
      2. Housing: Steel, painted
      3. Compressor: Hermetic with vibration isolation.
      4. Service Valves: Solid brass for liquid and suction lines located outside of unit
      5. Controls: Factory wired with thermal and current overload sensors
      6. Coil: aluminum fins, non-ferrous tubing
      7. Fan: Direct drive, propeller type, upblast
      8. Accessories: Pre-charged tubing package
   B. Indoor Unit:
      1. Refrigerant: R-410A
      2. Case: 20-gauge steel, enamel paint
      3. Fan: Forward curve centrifugal, statically and dynamically balanced, resiliently mounted, thermal overload protection
      4. Coil: Aluminum fins, non ferrous tubing. Pre-charged with sufficient refrigerant for system
      5. Controls: 24 volt transformer and fan relay
      6. Filter: Throwaway filter and mounting frame

PART 3 - EXECUTION

3.01 INSTALLATION
   A. Install outdoor unit on concrete pad.
   B. Locate outdoor unit using manufacturer’s recommended minimum clearances.
   C. Connect indoor unit and outdoor unit with pre-charged refrigerant lines.
D. Secure refrigerant lines as required to prevent vibration.

E. Coordinate control and power connections with Division 26.

F. Startup and test units for proper operation, both heating and cooling, in accordance with manufacturer’s recommendations.

END OF SECTION
SECTION 238218
BLOWER COIL UNITS

PART 1 - PART 1 - GENERAL

1.01 SECTION INCLUDES Blower Coil Units
   A. Section 23 05 23 - General Duty Valves for HVAC
   B. Section 23 05 48 - Vibration Isolation
   C. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC
   D. Section 23 21 13 - HVAC Piping

1.02 SUBMITTALS
   A. Submit product data for review including unit construction, coil performance, and controls.

1.03 QUALITY ASSURANCE
   A. All blower coil units shall be UL Listed and labeled.
   B. All blower coil units shall be in compliance with NFPA 90A.

PART 2 - PART 2 - PRODUCTS

2.01 MANUFACTURERS
   A. Enviro-Tec (JCI), Magic Aire, or Trane.
   B. Substitutions: Refer to Division 01.

2.02 EQUIPMENT REQUIREMENTS
   A. Blower coil units shall consist of separate copper tube, aluminum finned cooling and heating coils, insulated IAQ drain pan, and centrifugal fan with motor and drive mounted in a common cabinet.
   B. Blower coil units shall be internally insulated with 1" thick, 1-1/2 lb/cu.ft. density, foil faced insulation to prevent external sweating and heat loss and to provide acoustical attenuation.
   C. Access panels shall be provided on both sides of each unit.
   D. Blower coil casings shall be constructed of 18 gauge galvanized steel.
   E. Water Coils:
      1. Chilled water cooling coils shall be provided as scheduled per the drawings.
      2. All coils shall have seamless copper tubes with mechanically bonded aluminum fins.
      3. All coils shall be factory tested with 450 psi air under water. Maximum standard operating conditions shall be: 200 psig, 200 degrees F.
   F. Fans shall be DWDI centrifugal type with forward-curved wheels equipped with adjustable speed V-belt drive. Blower coil units shall have a single fan with permanently sealed ball bearings. All fans shall be dynamically balanced.
   G. Provide blower coil units with 2" pleated media filters with 30% efficiency (MERV 8) unless otherwise noted. Units shall be equipped with an integral flat filter section. Provide owner with a
complete set of new and unused filters for each unit at the time the building is completed. Do not operate units without filters.

H. All blower coil motors shall be open drip-proof, with permanently sealed ball bearings and internal current and thermal overload protection. Motors shall be factory installed and wired to the unit-mounted junction box.

I. Provide manual air vent to be located as the highest point of the supply or return lines.

J. Provide an auxiliary insulated drain pan of sufficient size to collect any condensation from coil connections and shut-off valves.

K. Provide unit hanging accessories and isolators as specified per Section 23 05 48.

L. Blower coil units shall have sufficient space for maintaining heating and cooling control package consisting of:
   1. Automatic cooling coil valve: 2-way (by Control Contractor)
   2. Valve shutoff package: (by unit manufacturer)
   3. Temperature sensor/thermostat: Wall mounted provided by Controls Contractor.
   4. Provide controls transformer as required.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install blower coil units at locations designated on the drawings in accordance with manufacturer's published instructions.

B. Provide piping connections per diagram on drawings.

C. Slope condensate drain piping to nearest floor drain, housekeeping closet mop sink, or as indicated on the drawings. Terminate drain with air gap 1" above flood rim.

D. Coordinate controls installation with Control Contractor.

3.02 START-UP AND TESTING

A. Start-up unit, check for satisfactory performance as required by plans and specifications.

B. Test units for fan operation and coil performance.

C. Insure that system piping is thoroughly vented, cleaned and all debris is removed from control valves to insure specified water flow.

D. Demonstrate operation to Owner's maintenance personnel and instruct them in system operation.

END OF SECTION
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Basic materials and methods, along with Division 01, General Requirements that are applicable to Division 26 Sections.

B. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 specification Sections apply to all Division 26 Sections.

1.02 QUALITY ASSURANCE

A. Comply with applicable local, state, and federal codes.

B. Warrant electrical Work against faulty material or Workmanship in accordance with Division 01. If the Project is occupied or the systems placed in operation in several phases at the request of the Owner's Representative, then the warranty of each system or piece of equipment used, shall begin on the date each system or piece of equipment was placed in satisfactory operation and accepted as such, in writing, by the Owner's Representative. The use of building equipment for temporary service and testing does not constitute the beginning of the warranty.

C. Equipment and material provided under this Division shall be periodically inspected and serviced by competent mechanics. This function becomes the responsibility of the Owner's Representative when the system is accepted by the Owner's Representative. The one year material and Workmanship warranty is not intended to supplant normal inspection or service and shall not be construed to mean the Contractor shall provide free service for normal maintenance items such as periodic lubrication and adjustment due to normal use, nor to correct without charge, breakage, maladjustment, and other trouble caused by improper maintenance.

D. Turn over electrical equipment provided under this Division to the Owner's Representative in lubricated condition. Include instructions on further lubrication in the operating manual.

E. Upon completion of contract and progressively as work proceeds, clean-up and remove dirt, debris and scrap materials. Maintain premises neat and clean. Protect and preserve access to energized equipment at all times. Clean items with factory finishes. Touch-up minor damage to surfaces; refinish entire piece of equipment when sustained major damage. Use only factory supplied paints of matching color and formula. Schedule an off-hour shutdown of all electrical equipment during the 2-week period preceding substantial completion. During this shut down, clean all buses and insulators inside all switchgear, switchboards, bus ducts, collector buses and panelboards located inside or adjacent to the project limits.

1.03 REGULATORY REQUIREMENTS

A. Perform Work specified in Division 26 in accordance with standards listed below of the latest applicable edition adopted by the authority having jurisdiction. Where these Specifications are more stringent, they shall take precedence. In case of conflict, obtain a decision from the Designer.

1. NFPA 30: Flammable and Combustible Liquids Code
2. NFPA 70: National Electrical Code
4. NFPA 75: Standard for Protection of Information Technology Equipment
5. NFPA 90A: Standard for the Installation of Air Conditioning and Ventilating Systems
6. NFPA 90B: Standard for the Installation of Warm Air Heating and Air Conditioning Systems
7. NFPA 92A: Standard for Smoke-Control Systems Utilizing Barriers and Pressure Differences
12. ANSI Handicapped Code-A117.1
13. U.L. Fire Resistance Index
14. UL White Book: General information for electrical construction, hazardous location, and electrical heating and air conditioning equipment
15. SBC: Standard Building Code
17. State of Tennessee Architectural Barriers Code
18. All applicable Occupational Safety and Health Administration (OSHA) Publications, Rules and Regulations.
19. Americans with Disabilities Act (ADA)

1.04 RELATED WORK SPECIFIED UNDER OTHER DIVISIONS

A. Foundations and pads required for equipment furnished under this Division.

B. Field painting, except such painting as is required to maintain shop coat painting and factory finish painting.

C. Heating, ventilating, and air conditioning equipment

D. Fireproofing

E. Cutting and patching for electrical Work, except for errors and omissions under this Division.

1.05 RELATED WORK - OWNER FURNISHED EQUIPMENT AND SYSTEMS

A. Security System Equipment

1.06 SUBMITTALS

A. Comply with provisions of Division 01.

B. Submit product data, equipment details, capacities, and shop drawings as specified in sections of this Division.

C. Submit fire alarm connection drawings with product data submission.

D. Submit dimensioned equipment room layouts.
   1. Show location of all electrical equipment in rooms including but not limited to:
      a. Elevator Equipment Rooms
      b. Mechanical Rooms
   2. Draw room layouts to 1/4" scale, with equipment locations shown therein. Clearances shall be in accordance with NEC and local codes. Indicate on drawing the mechanical equipment and mechanical and sprinkler pipe routing.
   3. Electrical equipment submittals will be rejected without dimensioned equipment room or equipment location layouts.

1.07 OPERATING AND MAINTENANCE MANUALS

A. Provide manuals in accordance with Division 01.
B. In addition to required submittals, include copies of all test reports required in Part 3, "Execution" of Section 26 05 00.

C. Provide completed warranty certificates for systems and equipment.

D. Provide tabulation of overload heaters, including each motor identified, nameplate data and o/l heater part number.

1.08 DELIVERY AND STORAGE

A. Insofar as possible, deliver items in manufacturer's original unopened packaging. Where this is not practical, cover items with protective materials to keep them from being damaged. Use care in loading, transporting, unloading, and storage to keep items from being damaged.

B. Store items in a clean dry place and protect from damage. Evidence of damage from water or other contaminants will be cause for rejection.

1.09 RECORD DRAWINGS

A. Comply with provisions of Division 01.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Equipment and materials furnished shall be listed by UL or other nationally accredited testing laboratory where available. When listing is not available for a piece of equipment, it shall be submitted in accordance with Drawings and Specifications and shall be approved by the authorities having jurisdiction.

B. Specifications and Drawings indicate name, type and/or catalog number of materials and equipment to establish standards of quality. Submittals shall be based on the standards specified. The standards should not be construed as limiting competition.

C. If materials and equipment other than specified herein are intended to be submitted, a letter providing a list of all the suggested alternates by section number, brand and series or model shall be submitted to the Designer for review and approval. Submit in accordance with Division 01 and a minimum of 10 days prior to submission of bids.

2.02 FUSES

A. Provide fuses as scheduled on Drawings for switchboards, power panelboards and disconnecting switches.

B. Acceptable Manufacturers: Bussmann; Gould Shawmut; Littelfuse, Inc.

C. Provide fuses of one manufacturer only. Place the same type fuse in each pole of a switch.

D. Use these types:
   1. Class L-601A-6000A; Switchboards, all load types
   2. Class J-Time Delay-1A-600A; Switchboards, motor loads
   3. Class J-Fast Acting-1A-600A; Switchboards, other loads
   4. Class RK5-Time Delay-1/10A-600A; Power panels and fusible switches, motor loads
   5. Class RK1-Fast Acting-1A-600A; Power panels and fusible switches, other loads

E. Provide a manufactured fuse storage cabinet complete with one set (3 fuses) of spare fuses for each type and rating installed in this Project.
PART 3 - EXECUTION

3.01 COORDINATION

A. Install equipment in accordance with manufacturer's recommendations. Where conflicts occur between Contract Documents and these recommendations, request a ruling before proceeding with such Work.

B. Visit site and observe conditions under which work must be performed. No subsequent allowance will be made because of error or failure to obtain necessary information to completely estimate and perform work required by these documents.

C. Examine Specifications and Drawings to be familiar with items which require electrical connections and coordination. Electrical Drawings are diagrammatic and shall not be scaled for exact sizes.

D. Prior to commencement of installation, prepare coordination drawings for work under this division, as specified in Division 01 and as called for herein. Coordinate work under other divisions, including but not limited to mechanical, plumbing, fire protection, telecommunication and miscellaneous steel to develop these coordination drawings that will serve as the agreed upon plan for a coordinated installation of work for all trades. Include electrical equipment, switchgear, panelboards, starters, disconnect switches, cable tray, conduit racks and conduits 3" and larger on drawings confirming coordination with other trades. Incorporate the information onto the coordination drawings required under Division 01 and 23 to develop master coordination drawings. Account for lighting fixture depths in the coordination. Inform Design Professional of conflicts that cannot be resolved.

E. Do NOT submit coordination drawings to Designer for review. Keep a copy on site for reference purposes. Notify Designer of conflicts that cannot be resolved.

3.02 FEES AND PERMITS

A. Obtain and pay for all necessary permits and inspection fees required for electrical installation.

3.03 DEMOLITION

A. Visit the site to observe existing conditions before submitting a bid.

B. Work in existing buildings shall be scheduled well in advance with the Owner's Representative. Work shall be performed at such times and under such conditions as suit the convenience of the Owner's Representative. Plan the Work to minimize disruption of normal operations. Notify Owner's Representative before any circuit is de-energized in occupied areas.

C. Reconnect circuits to other panelboards when required to complete the renovation shown.

D. Remove abandoned wire and conduit back to source. Splice and terminate in junction boxes as appropriate. Where entire circuit is to be removed, remove conduit and wire back to existing panelboard. Where such work would not be possible without disturbing areas not being renovated, consult with the Architect prior to performing the work.

E. Where a circuit is interrupted by removal of a device or fixture from that circuit, install wire and conduit as required to restore service to the remaining devices and fixtures on that circuit. Ensure proper grounding is maintained.

F. Lighting fixtures, wiring devices, panelboards, equipment, conduits and conductors removed shall be transported to the Owner's designated location and offered to the OWNER. If he chooses to retain these items or a part of these items, turn those chosen over to him. Items rejected by the
OWNER shall be removed completely from the project site and disposed of legally by the CONTRACTOR.

3.04 CUTTING AND PATCHING

A. Comply with provisions of Division 01.

B. Repair or replace routine damage caused by cutting in performance of Work under this Division.

C. Correct unnecessary damage caused due to installation of electrical Work, brought about through carelessness or lack of coordination.

D. Holes cut through floor slabs shall be core drilled with drill designed for this purpose. All openings, sleeves, and holes in slabs between floors shall be properly sealed, fire-proofed and water-proofed.

E. Holes cut through walls shall be drilled or cut with tools designed for the purpose. All openings, sleeves and holes in walls that extend to underside of floor above shall be properly sealed and fire-proofed.

F. Repairs shall be performed with materials which match existing materials and be installed in accordance with appropriate sections of these Specifications.

G. Contractor shall not be permitted to cut or modify any structural members without the written permission of the Designer.

3.05 CONTROL SYSTEMS AND INTERLOCK WIRING

A. Control systems, components and control and interlock wiring for mechanical equipment will be furnished under Division 23. Control devices including, but not limited to VFD's, thermostats, fan speed and level control switches, relays and electro-pneumatic switches shall be furnished under Division 23.

B. Provide magnetic starters per Section 26 29 13.

C. Provide manual motor starters per Section 26 29 13.

D. Provide power wiring to starters and contactors under Division 26. Power wiring to magnetic starters shall consist of wiring to the line side terminals of the magnetic starter or contactor and wiring away from the load side terminals to the equipment, except where such wiring is installed pre-wired by the equipment vendor.
   1. Power wiring to 120V, 1-phase, 60 Hz and 277V, 1-phase, 60 Hz volt fans, unit heaters, fan-coil units, VAV boxes, pumps and other equipment shall include all portions of the branch circuit, except for wiring inside an automatic temperature control panel (ATC) or Direct Digital Control Panel (DDC), Building Automation System panels, equipment control panels, or magnetic starters. Such internal wiring shall be furnished under Division 23.

E. Under Division 28:
   1. Provide wiring among detectors, fire alarm system, magnetic starters and relays, ATC panels and DDC panels.

F. See Building Automation System sections of Division 23.

3.06 TESTING ELECTRICAL SYSTEMS

A. On completion of work, installation shall be completely operational and entirely free from grounds, short circuits, and open circuits. Perform operational tests as required to demonstrate substantial
completion of the Work. Balance circuits so that feeders to panels are not more than 10% out of balance between phases with all available load energized and operating. Furnish all labor, materials and instruments for above tests. All ampere readings shall be made with a true RMS reading meter.

B. Perform megger tests of all new service entrance circuits, feeder and branch circuits size #4 AWG and larger. Provide a report of all such megger test results.

C. Furnish the Designer a copy of test reports and required certification including but not limited to the following:
   1. Fire alarm system certification
   2. Megger test results

D. Prior to final observation and acceptance test, install all electrical systems and equipment complete and in satisfactory operating condition.

END OF SECTION
SECTION 260519

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Comply with the provisions of Section 26 05 00.

B. Provide a complete system of conductors for lighting, power, and systems throughout the project.

1.02 RELATED WORK

A. Section 26 05 00: Common Work Results for Electrical

B. Section 26 05 33: Raceways and Boxes for Electrical Systems

1.03 REFERENCES

A. NEMA WC 3 - Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

B. NEMA WC 5 - Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

C. ANSI/UL 83 - Thermoplastic-Insulated Wire and Cables

D. NFPA 70 - National Electrical Code, latest edition

1.04 SUBMITTALS

A. Submit the data sheets for products furnished under this Section.

1.05 DELIVERY, STORAGE AND HANDLING

A. Provide factory-wrapped waterproof flexible barrier material for covering wire and cable wood reels, where applicable, and weather resistant fiberboard containers for factory packaging of cable, wire and connectors, to protect against physical damage in transit. Damaged cable, wire or connectors shall be removed from project site.

B. In their factory-furnished coverings, store cable, wire and connectors in a clean, dry indoor space which provides protection against the weather.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. American Insulated Wire

B. United Copper

C. Encore

D. Pyrotenax (Mineral Insulated applications)

E. Republic Wire
F. Southwire
G. Superior Essex
H. Cerrowire
I. Okonite
J. General Cable

2.02 CONDUCTORS

A. Provide 98% conductivity copper conductors with 600V insulation.
B. For conductors No. 12 AWG and No. 10 AWG provide stranded type THWN or THHN.
C. For conductors No. 14 AWG and smaller provide solid type THHN.
D. For conductors No. 8 AWG and larger provide stranded type THHN or THWN applied consistently with insulation ratings and NEC requirements.
E. Provide white or gray colored neutral conductors; provide color coded phase conductors.
F. Minimum conductor size shall be:
   1. #12 for power wiring
   2. #14 for hard wired controls unless otherwise specified
G. Fire alarm wire and cable shall meet the requirements of NFPA 70, Article 760. Where required by code and other sections of the specification, fire alarm wire and cable shall be MI type cable, UL listed as Fire-Resisting Cable (FHJR).
H. Provide digital communication, network cabling, and other low voltage systems wiring as directed elsewhere in this specification.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Conductors shall be continuous from origin to panel or equipment termination without splices. Where splices and taps are necessary or required, they shall be made in splice boxes.
B. Install pull boxes in circuits or feeders over 100’ long.
C. Make splices and connections only in outlet, pull or junction boxes. Twist conductors together before installing wire nuts or connectors.
D. Multi-wire branch circuits shall not be used. Install a separate grounded conductor, (neutral) for each circuit.
E. Use powdered soapstone or pulling compound to pull conductors.
F. Deliver conductors to jobsite new and in original wrapping, package or reel.
G. Conductors and connections shall test free of grounds, shorts, and opens.
H. Provide No. 10 wire in lieu of No. 12 wire for any branch circuit in excess of 100 feet (120V) or 150 feet (277V) of circuit length to farthest device to prevent excessive voltage drop.
I. Use Ideal wire nuts, Scotchlok Type Y, R, G, or B connectors for fixture connections at outlet boxes.

J. Make feeder taps and joints with approved compression sleeves. Insulate sleeves with heat shrink tubing, rated 600V, 90 degree C, containing factory applied sealant.

K. Leave a minimum of 8” slack wire in every outlet box whether it be in use or left for future use.

L. Color code conductors as follows:
   1. 120/208 Volt Systems:
      a. Phase A - Black
      b. Phase B - Red
      c. Phase C - Blue
      d. Neutral - White
      e. Ground - Green
   2. 277/480 Volt Systems:
      a. Phase A - Brown
      b. Phase B - Orange
      c. Phase B - Purple
      d. Phase C - Yellow
      e. Neutral - Gray
      f. Ground - Green

M. Use factory color coded conductors where commercially available. If not available, use black conductors and band with color tape.

N. Install in each branch-circuit panelboard a legend explaining color code for ungrounded conductors.

O. Complete conduit system, including bushings, before pulling wire and cable.

P. Maintain separation of electric light, power, Class 1, 2 and 3 wiring throughout raceway systems. Comply with requirements of NFPA-70, Paragraphs 300-3, 725-15 and 725-54.

Q. Support cables at 3 foot intervals horizontally and 6 foot intervals vertically. Utilize supporting hardware available from the manufacturer in accordance with manufacturer's recommendations.

R. Single conductor cables for multiphase applications shall be configured in tri-foil arrangement as directed by manufacturer.

S. Parallel runs shall be spaced two cable diameters apart.

T. Terminations, splices, and joints shall be performed with products and tools from the manufacturer. Fire-rated joints shall be made and installed by the manufacturer.

3.02 FIELD TESTING

A. Visually check wire, cable, and connectors for physical damage and proper installation.

B. Check continuity of wire and cable using a low voltage DC tester.

C. Check for proper torque on all mechanical connections.
D. Perform a 1000 VDC megger test on all 600 volt insulated wire or cable #4 AWG and larger under the Scope of this project. Check each wire to ground and to all other wires in the same cable or conduit by connecting each wire not under test together and to ground. Wire or cable shall be disconnected at each end and protected from current leakage during testing.

1. Service entrance circuits and feeder (800A and larger) circuits:
   a. Use a motor driven megger such as Biddle MJ359 or equal.
   b. Perform a polarization index test using a 10-minute test period. Record the megohm readings at 1 minute and at 10 minutes. Calculate the polarization index (10 min / 1 min readings) and record.

2. Feeder (600A and smaller) circuits and branch circuits:
   a. Use either a motor driven (Biddle 359) or a hand crank (Biddle MJ159) megger.
   b. Perform a dielectric absorption ratio test using a 60-second test period. Record the megohm readings at 30 seconds and 60 seconds. Calculate the dielectric absorption ratio (60 sec / 30 sec readings) and record.

E. Provide four (4) copies of the megger test report to the Engineer. The report shall be in a tabulated format and shall include the following as a minimum.

1. Circuit identification
2. Type of raceway
3. Approximate length of circuit
4. Megohm readings
5. Polarization index or dielectric absorption ratio
6. Ambient temperature
7. Approximate humidity (dry, average, or humid)

F. Results:
1. Acceptable:
   a. Megohms greater than (1.6 x 1000 / length)
   b. Polarization index greater than 2.0 or a dielectric absorption ratio greater than 1.4

2. Questionable (must be discussed with Engineer):
   a. Polarization index range 1.0 < 2.0 or a dielectric absorption ratio range 1.0 < 1.4

3. Unacceptable (wire or cable must be replaced):
   a. Megohms less than (1.6 x 1000 / length)
   b. Polarization index less than 1.0 or a dielectric absorption ratio less than 1.0

END OF SECTION
SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 WORK INCLUDED
A. Comply with the provisions of Section 260500.
B. The entire system of raceways and equipment under the scope of this project shall be grounded in accordance with Articles 250 and 517 of the National Electrical Code and any local regulation or governing authority.

1.02 SUBMITTALS
A. Submittals are not required for products in this Section.

PART 2 - PRODUCTS

2.01 REQUIREMENTS
A. Ground Clamps: OZ-Gedney, Type "CG", or equal by Steel City or Appleton.

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS
A. General:
1. Clean all conductive surfaces on equipment to be grounded, to ensure good electrical continuity.
2. Effectively bond all grounding conductors to grounding electrodes, equipment enclosures and ground buses.
3. Locate all grounding attachments away from areas subject to physical damage. Provide protective covering as required.
4. All conduits shall have separate ground wire installed in accordance with Table 250.122 of the National Electrical Code.

B. Feeder/Branch Circuits:
1. Provide a separate green grounding conductor in the conduit of feeder circuits for the following equipment, sized in accordance with Table 250.122 of the National Electrical Code:
   a. Panelboards
   b. Switchboards
   c. Motor control centers
   d. Transfer switches
2. Install a separate green grounding conductor in same conduit as phase and neutral conductor from panel ground bus to device for branch circuits. Install an equal number of grounding and neutral conductors. Size the grounding conductor in accordance with Table 250.122 of the National Electrical Code.
3. Bond the receptacle ground pin to its box using a bonding jumper, except where isolated ground receptacles are required.
4. Flexible conduit will not be approved as a grounding means. Flexible conduit shall have a jumper wire sized to ampacity of branch breaker and connected to conduit system on both ends. This applies to fixtures, motors, controls and other devices.
C. Transformers:
   1. Provide a copper bonding jumper to ground the secondary neutral of transformers. Provide a grounding electrode conductor (sized in accordance with National Electrical Code Table 250.66 for the derived phase conductors) to bond the secondary ground of the transformer to the grounding electrode system including the grounding conductor of the primary feeder, the building steel and a cold water main, 1-1/2 inch or larger. Bond across any dielectric unions between point of connection and domestic water entrance.

END OF SECTION
SECTION 260529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Comply with the provisions of Section 26 05 00.

B. Provide a system of supporting devices and hangers for support or bracing of conduit, electrical equipment, including safety switches, fixtures, outlet boxes, junction boxes, cabinets, etc.

1.02 RELATED WORK

A. Section 26 05 33: Raceways and Conduit Systems

B. Section 26 05 34: Pull and Junction Boxes

C. Section 26 05 35: Outlet Boxes

1.03 SUBMITTALS

A. Submittals are not required.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Erico Products, Inc

B. Steel City

C. Minerallac

D. Rayco Fasteners

2.02 TYPES OF SUPPORTING DEVICES

A. Provide appropriate supporting means as detailed on Drawings.

B. Unless otherwise directed in Specifications or Drawings, provide appropriate supporting devices and hangers for electrical equipment from this list of Caddy fasteners:

1. "Z" purlin clips - 1-1/4" maximum conduit

2. Conduit clips - 2" maximum conduit

3. Beam clamps (rod hanger clamps and vertical flange clamps) for support of threaded rods

4. Beam clamps (set screw type) - 2" maximum conduit

5. Beam clamps (universal) for support of boxes and combination conduit hanger clamps

6. Combination push-in conduit clips - 1" maximum conduit

7. Combination conduit hanger clamps - 2" maximum conduit

8. Flexible conduit clips - 1" maximum flexible conduit

9. Special combination conduit clips - 1" maximum conduit

10. One hole steel straps

11. Conduit hangers - 4" maximum conduit

12. Combination box/conduit hangers for supporting conduit within 3'-0" of a box are not acceptable
PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Secure conduits to within 3 feet of each outlet box, junction box, cabinet and fitting and at intervals not to exceed ten feet in accordance with current edition of the National Electrical Code.

B. Install clamps secured to structure for feeder and other conduits routed against the structure. Use drop rods and hangers to support conduits run apart from the structure.

C. Provide and install suitable angle iron, channel iron or steel metal framing with accessories to support or brace electrical equipment including safety switches, fixtures and panelboards.

D. Paint all supporting metal not otherwise protected, with rust inhibiting primer and then with a finish coat if appropriate to match the surrounding metal surfaces. (Prepainted or galvanized support material is not required to be painted or repainted.)

E. Use of chains, perforated iron strap, baling wire, or tie wire for supporting conduit runs will not be permitted.

F. Use of Caddy clips to support conduit to top of t-bar ceiling grid will not be permitted.

G. For support of low voltage wiring not required to be in conduit, Contractor shall bundle cables together in a neat manner using approved nylon cable ties. Bundled cables shall be supported with "J" hooks on telephone type bridle rings, a minimum of six feet on centers.
   1. Use UL listed cable ties for plenum use in plenum areas.
   2. Maximum supported weight rating of "J" hooks shall not be exceeded.
   3. Identify differing types of cables and tag them with tape indicating service, i.e., telephone, data, control.
   4. Identification tape shall be provided at minimum intervals of 25 feet on center and within each individual space.

END OF SECTION
SECTION 260533

RACEWAYS AND CONDUIT SYSTEMS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Comply with the provisions of Section 260500.

B. Provide a complete conduit system with associated couplings, connectors, and fittings.

1.02 RELATED WORK

A. Section 260529: Hangers and Supports for Electrical Systems

1.03 SUBMITTALS

A. Submittal of products furnished under this Section is not required.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. EMT and IMC shall be steel (ferrous) with a protective coating, and RMC conduit shall be steel (ferrous) with a protective coating or aluminum (non-ferrous) by Allied, General Electric, Republic, Triangle, or Wheatland. Special use may be red brass or stainless steel.

B. EMT, IMC, or RSC couplings, connectors and fittings shall be steel or malleable iron as manufactured by Raco, Crouse-Hinds, or equivalent.

C. Erickson type couplings shall be used where neither length of conduit can be rotated.

D. EMT box connectors and couplings shall be set screw type.

E. Conduit, connectors, couplings and fittings shall be UL listed and labeled.

2.02 ELECTRICAL METALLIC TUBING (EMT)

A. Use Electric Metallic Tubing (EMT) where shown on drawings or for:
   1. Concealed in walls
   2. Installed above suspended ceilings
   3. Installed exposed, above 6 feet

2.03 INTERMEDIATE METAL CONDUIT (IMC)

A. Use Intermediate Metal Conduit (IMC) where shown on drawings or for:
   1. Installed for feeders
   2. Installed exposed below 6 feet

2.04 RIGID STEEL CONDUIT (RSC)

A. Use rigid steel conduit where shown on drawings or for:
   1. For emergency feeders
   2. Exposed to severe mechanical damage
2.05 FLEXIBLE METAL CONDUIT
   A. Provide flexible metal conduit for termination at equipment subject to motion and vibration.
   B. Conduit shall be electrically continuous from outlet or conduit end to utilization equipment.
   C. Length shall not exceed 6 feet.
   D. Maximum length concealed in walls shall be 3 feet.
   E. Where exposed to continuous or intermittent moisture, conduit shall be liquid tight.

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS
   A. Minimum size of conduits shall be 3/4".
   B. Conduit joints shall be cut square, threaded, reamed smooth, and drawn up tight so conduit ends will butt in couplings, connectors and fittings.
   C. Make bends or offsets with standard factory bends or field bends with an approved bender. Use of heat and other non-approved methods will not be accepted.
   D. Run concealed conduits in direct line with long radius bends or offsets. Run exposed conduits parallel to and at right angles to building lines. Group multiple conduit runs in banks and maintain proper separation to prevent any derating of cable.
   E. Conduit systems shall be electrically and mechanically continuous.
   F. For interior locations where NEMA 1 enclosures are used, secure conduits to boxes and cabinets with double locknuts and bushing.
   G. For interior locations where NEMA 12 enclosures are used, secure conduits to boxes and cabinets with sealing locknuts and bushing.
   H. For damp or wet locations, indoor or outdoor locations where NEMA 4 or 4X enclosures are used, secure conduits to boxes and cabinets with Myers Scru-Tite hub.
   I. Cap ends of conduits to prevent entrance of water and other foreign material during construction.
   J. Complete conduit systems before pulling conductors.
   K. Support conduits as specified in Section 260529 and in accordance with National Electrical Code.
   L. Provide cable supports in conduits rising vertically in accordance with the National Electrical Code, Article 300.
   M. Provide insulated bushing on both ends of empty conduits.
   N. Conduits which pass through floor slabs shall be sealed with UL listed fire-stopping materials. Seal around conduits or other wiring materials passing through partitions, which extend to the underside of the slab above, and those passing through smoke partitions and fire rated walls. Use U.L. listed materials to prevent passage of smoke or fire. See Division 07 for specific materials required.
O. Conduits which enter crawl spaces, tunnels, and basements from outside the building shall be grouted-in to prevent entry of gases, vapors, insects or rodents to these spaces from street mains.

P. Conduit not serving elevator equipment shall not be permitted to pass through elevator shafts or elevator equipment rooms.

Q. Where IMC or RMC conduit is connected to a panelboard, switchboard, cabinet, junction box, pull box or auxiliary gutter, conductors shall be protected by insulated bushings. Locknuts shall be installed on conduit outside and inside enclosure.

R. Use expansion fittings or flexible conduit, properly bonded, to ensure ground continuity across expansion joints in floors and ceilings.

S. Horizontal and vertical runs of alarm and communications systems shall be installed in a 2 hour assembly in accordance with applicable high rise codes. Vertical enclosures shall be aligned and shall be accessible from common or public areas.

T. Terminate conduits for feeders and branch circuits directly into panelboard enclosures from which they are served without the use of pull boxes, junction boxes, wire ways, or auxiliary gutters. If the panelboard enclosure does not provide sufficient surface area for all conduits, notify the Engineer and request directions.

U. Failure to route conduit through building without interfering with other equipment and construction shall not constitute a reason for an extra charge. Equipment, conduit, and fixtures shall fit into available spaces in building and shall not be introduced into building at such times and manner as to cause damage to structure. Equipment requiring servicing shall be readily accessible.

V. Where any conduit penetrates fire-rated walls, partitions, or floors sufficient annular space shall be provided and filled with fireproofing material to maintain the integrity of the fire-rating.

W. Where feeder or branch conduits enter pull boxes or junction boxes, clearly mark on conduit on the entering and leaving side of each box the panel name and circuit number(s) contained within the conduit using a permanent black marker.

X. Conduits routed horizontally on roof tops shall be supported by 5" high supports as manufactured by Dura_Blok, "DB Series", Erico, Mifab or equal. Supports shall be spaced as required by the NEC. Conduits shall be continuously marked on two sides with a 1" reflective tape as manufactured by Seton, Style No M9562, Brady or 3M.

3.02 FLEXIBLE METAL CONDUIT

A. Conduits shall be 1/2" minimum size for utilization equipment.

B. Fittings shall be made of either steel or malleable iron only.

C. A copper ground wire shall be installed as a jumper around flexible conduit. The jumper may be installed inside of flexible conduit or outside of conduit to ensure continuity of ground.

D. Install liquid tight flexible conduit in such a manner as to prevent liquids from running on the surface toward fittings.

E. Allow sufficient slack conduit to reduce the effect of vibration.

END OF SECTION
SECTION 260534
PULL AND JUNCTION BOXES

PART 1 - GENERAL

1.01 WORK INCLUDED
   A. Comply with the provisions of Section 26 05 00.
   B. Provide pull and junction boxes of appropriate size and depth as indicated on the drawings and as specified hereinafter.

1.02 RELATED WORK
   A. Section 26 05 29: Hangers and Supports for Electrical Systems
   B. Section 26 05 33: Raceways and Conduit Systems
   C. Section 26 05 53: Identification for Electrical Systems

1.03 SUBMITTALS
   A. Submit product data for each type of box used in exterior work.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
   A. For interior work, provide galvanized sheet metal boxes of code thickness with lapped and welded joints, 3/4" flanges and screw covers.
   B. For exterior work, provide galvanized sheet metal boxes of code thickness with lapped and welded joints, 3/4" flanges, bolted covers with full gaskets forming a completely rain-tight assembly, equal to Keystone 19000 and 37900 Series, Highline Building Products, Type PHA or Old Castle Precast Series.

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS
   A. Provide junction boxes as shown on drawings and otherwise where required, sized according to number of conductors in box or type of service to be provided. Minimum junction box size 4" square and 2-1/8" deep.
   B. Provide screw covers for junction boxes.
   C. Install boxes in conduit runs wherever necessary to avoid excessive runs or bends. Do not exceed 100' runs without pull boxes.
   D. Rigidly secure boxes to walls or ceilings. Conduit runs will not be considered as adequate support.
   E. Install boxes with covers in accessible locations. Size boxes in accordance with Article 314 of the National Electrical Code.
   F. Do not install pull or junction boxes for joint use of line voltage and signal or low voltage controls unless all conductors are insulated for the highest voltage being used in the same box.
G. Color code pull and junction boxes and identify feeders and circuits entering pull and junction boxes as called for in Section 26 05 53.

END OF SECTION
PART 1 - GENERAL

1.01 WORK INCLUDED

A. Comply with the provisions of Section 26 05 00.

B. Provide each fixture, switch, receptacle, and other wiring device with a galvanized outlet box of appropriate size and depth for its particular location and use.

1.02 RELATED WORK

A. Section 26 05 29: Hangers and Supports for Electrical Systems

B. Section 26 05 33: Raceways and Conduit Systems

C. Section 26 05 53: Identification for Electrical Systems

1.03 SUBMITTALS

A. Submittal of products furnished under this Section is not required.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. National

B. Appleton

C. Raco

D. General Electric

E. Steel City

2.02 SUPPORTING DEVICES

A. Provide appropriate supporting devices for outlet boxes by Caddy Fasteners (designations below are Caddy designations), Cooper, Raco or approved equal as follows:
   1. "RB" box mounting brackets
   2. Screw gun box brackets
   3. "H" box mounting brackets

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Locate boxes to prevent moisture from entering or accumulating within them.

B. Support outlet boxes independently of conduit, as required by the National Electrical Code.

C. Provide 4" octagonal x 1-1/2" deep ceiling outlet boxes. For increased cubic capacity, provide 4" octagonal x 2-1/8", 4" square x 1-1/2" or 4-11/16" square x 2-1/8" ceiling outlet boxes.
D. Provide fittings with threaded hubs for screw connections and with the proper type covers for switches and receptacles served by exposed conduit. Provide condulets with threaded hubs and covers and with proper configurations for all changes of direction of exposed conduits. Standard conduit ells may be used if they do not interfere, damage, or mar the appearance of the installation.

E. Use boxes of sufficient cubic capacity to accommodate the number of conductors to be installed in compliance with Article 314 of the NEC.

F. Effectively close unused openings in boxes with metal plugs or plates.

G. Caddy "H" type box mounting brackets shall not be used on exterior walls, chase walls, or in any other installation where the backside of the stud wall will not be finished. Do not use 4" brackets in thicker stud walls which will not provide adequate bracing.

H. Secure boxes to surfaces upon which they are mounted or embed boxes in concrete masonry. Support boxes from structural members with approved braces.

I. Install blank device plates on outlet boxes left for future use.

J. Provide bushings in holes through which cords or conductors pass.

K. Install boxes so that the covers will be accessible at all times.

L. Electrical outlet boxes may be installed in vertical fire resistive assemblies classified as fire/smoke and smoke partitions without affecting the fire classification, provided such openings occur on one side only in each framing space, that openings do not exceed sixteen square inches and that boxes on opposite faces of a partition are separated horizontally not less than 24 inches. All clearances between such outlet boxes and the gypsum board shall be completely filled with joint compound or approved fire-resistive compound. The wall shall be built around outlet boxes larger than sixteen square inches so as not to interfere with the wall rating.

M. Color code boxes and identify circuits in conduits entering boxes as called for in Section 26 05 53.

END OF SECTION
SECTION 260553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 WORK INCLUDED
A. Requirements for identification of electrical equipment, circuit identification, system color coding and warning signs.

1.02 RELATED WORK
A. Section 26 05 00: Common Work Results for Electrical

1.03 SUBMITTALS
A. Submittal of product furnished under this section is not required.

PART 2 - PRODUCTS

2.01 IDENTIFICATION OF DISTRIBUTION AND ELEVATOR EQUIPMENT
A. Identify electrical equipment with permanently attached phenolic plates with 1/4” white or black engraved lettering on the face of each, attached with two sheet metal screws. Provide nameplate colors as specified in other parts of this section.

B. Include the following information on panelboard identification plates:
   1. Panel name
   2. Name of panel serving it
   3. Voltage and phase
   4. Branch of electrical system
   5. On service equipment, legibly mark in the field the maximum available fault current and the date that the fault current calculation was performed per NEC 120.24, 2011.

2.02 CIRCUIT IDENTIFICATION
A. Identify feeder j-boxes and pull boxes with designation of panelboard/switchboard source as "FROM" and load served as "TO" with permanent labels.

B. Identify pull and junction boxes with the designation of panelboard and the circuit number of each circuit contained therein, with permanent marker. Clearly mark information on or in the box, not on the cover, so that the information is easily identifiable.

C. Identify circuits in conduits entering outlet boxes with the designation of panelboard and the circuit number of each circuit contained therein, with permanent marker.

2.03 COLOR CODE IDENTIFICATION
A. Color code phenolic plates utilized to identify electrical equipment according to which branch of the electrical system the equipment is connected to as follows:
   1. Normal - Black with white letters.
   2. Fire Alarm - Red with white letters.
   3. Emergency - Yellow with black letters.

B. If existing equipment identification nameplates are a different color, request a ruling from the design professional to determine what color scheme to follow.
   1. Emergency - Yellow
2. Equipment Branch - Green
3. Fire Alarm System - Red

C. The color code as outlined below shall be used. In addition, on each panelboard, pull box, control cabinet, or other electrical enclosure that contains circuits from more than one system, provide an engraved phenolic plate and indentify the circuit conductors with the following color code: 208Y/120, Phase A, black, Phase B, red, Phase C, blue, grounded conductor, white, equipment grounding conductor, green, isolated equipment grounding conductor, green/yellow stripe. 480Y/277, Phase A, brown, Phase B, orange, Phase C, yellow, grounded conductor, gray, equipment grounding conductor, green, isolated equipment grounding conductor, green/red stripe.

2.04 WARNING SIGNS

A. Provide warning signs called for by NFPA 70, NFPA 70E, OSHA, and the list included below.

B. Use Seton Name Plate Company products, 10" x 7" size, pressure-sensitive (PSPL) for indoor use, 30 ga. baked enamel for outdoor use (30 BE) with style numbers shown below.

C. Danger - Electrical Hazard - Authorized Personnel Only, Style No. 161.
   1. Main electrical room(s)
   2. Electrical equipment closet(s)
   3. Electrical equipment spaces

PART 3 - EXECUTION

3.01 INSTALLATION

A. Identify the following electrical equipment as called for herein:
   1. Panelboards
   2. Safety switches and disconnects
   3. Contactors and motor starters
   4. Transfer switches
   5. Cabinets:
      a. Control cabinets
      b. Fire alarm cabinets
   6. Individually mounted circuit breakers
   7. Relays
   8. Transformers, motor starters, VFDs and relays connected under this Division shall be identified whether furnished under this Division or under other Divisions.

END OF SECTION
PART 1 - GENERAL

1.01 WORK INCLUDED
A. Comply with the provisions of Section 26 05 00.
B. Provide circuit breaker type panelboards as indicated on drawings and as specified hereinafter.

1.02 RELATED SECTIONS
A. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables
B. Section 26 05 26: Grounding and Bonding for Electrical Systems
C. Section 26 05 53: Identification for Electrical Systems

1.03 REFERENCES
A. UL 67 Panelboards
B. UL 50 Cabinets and Boxes
C. NEMA PB 1
D. Federal Spec W-P-115C

1.04 SUBMITTALS
A. Submit the following product data for review:
   1. Shop drawings showing circuit breaker or fusible switch layout, dimensions, voltage, phasing, continuous current capacity, short circuit rating, series rating (if applicable)
   2. Conduit entry location, cable termination sizes, mounting

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
A. Square D
B. General Electric
C. Eaton/Cutler-Hammer
D. Siemens Energy and Automation

2.02 PANELBOARD TYPES
A. Circuit breaker type lighting and appliance panelboards for 120/208 volts, 3-phase, 4-wire service shall be equipped with circuit breakers having AIC ratings as indicated on the drawings, but not less than 10,000 AIC. Panelboards shall be equal to:
   1. Square D, "N" Series
   2. General Electric, Type AQ
   3. Eaton/Cutler-Hammer, Type PRL1A
   4. Siemens, Type P1
B. Circuit breaker type lighting and appliance panelboards for 277/480 volts, 3-phase, 4-wire service shall be equipped with circuit breakers having AIC ratings as indicated on the drawings, but not less than 14,000 AIC. Panelboards shall be equal to:
1. Square D, “N” Series
2. General Electric, Type AE
3. Eaton/Cutler-Hammer, Type PRL2A
4. Siemens, Type P2

C. Circuit breaker type power distribution panelboards for 277/480 volts, 3-phase, 4-wire service shall be equipped with circuit breakers having AIC rating as indicated on the drawings. Where AIC ratings are not shown on drawings, obtain the rating requirements from the Designer. Panelboards shall be equal to:
1. Square D, "I-Line" Series distribution type
2. General Electric, "Spectra" Series distribution type
3. Eaton/Cutler-Hammer, "PRL4B" distribution type
4. Siemens, Type P4 or P5 depending upon panelboard ampacity

D. Bus bars shall be copper.

E. Power distribution panelboards shall be a minimum 36" in width.

F. Power distribution panelboards shall be furnished with full-height bussing.

2.03 REQUIRED FEATURES

A. Provide circuit breakers with lugs (both main and branch circuit lugs) suitable and UL listed for both aluminum and copper conductors and rated for minimum 75 degrees C.

B. Provide electrically isolated factory installed neutral bus. Neutral bus shall have at least 100% connection points based on panel circuit rating.

C. Provide separate ground bars complete with lugs or connectors on bar. Provide an additional copper isolated/insulated ground bar where indicated on drawings.

D. Panelboard assembly shall be enclosed in a steel cabinet. The size of the wiring gutters shall be in accordance with U.L. Standard 67. Fronts shall have door with matching trim, be of code gauge full finished steel with rust inhibiting primer and baked enamel finish.

E. Cabinets shall be equipped with spring latch and tumbler lock on door of trim. Doors over 48" long shall be equipped with three point latch and vault lock. All locks shall be keyed alike.

F. Surface mounted panelboards shall be provided with hinged trims such that devices, lugs, and gutters may be exposed without completely removing trim.

G. Provide thermal magnetic circuit breakers which are fully rated and temperature rated for a 40 degrees C ambient. Breakers shall be quick-make, quick-break type with trip indication shown by handle position other than ON or OFF and with a common trip on all multi-pole breakers.

H. Refer to drawings for numbers of branch circuits, their ratings, number of poles and arrangements.

I. Exposed external surfaces of the enclosure and cover shall be properly cleaned and painted gray, ANSI 61.
PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Install per manufacturer's recommendations and contract documents.

B. Install branch circuits using a separate neutral for each circuit. Multi-wire circuits are not acceptable.

C. Provide six circuit breaker handle lock-on devices for each branch-circuit panelboard, installed as directed by Owner's Representative, to prevent unauthorized personnel from turning off circuits to controls, unit heaters, clocks, night lights. Turn spare lock-on devices over to the Owner's Representative.

D. Provide typed directory cards under plastic on the doors of branch circuit panelboards. Directories shall indicate devices being served including space numbers or space names in which devices or fixtures are located. Space names and numbers shall match the graphics installed if different from the space names and numbers on the drawings.

E. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacturer's recommendations.

F. Check all installed panels for proper grounding, fastening, and alignment.

G. Remove debris from panelboards and wipe dust and dirt from all components.

H. Repaint marred and scratched surfaces with touch-up paint to match original finish.

END OF SECTION
SECTION 262726
WIRING DEVICES

PART 1 - GENERAL

1.01 WORK INCLUDED
   A. Comply with the provisions of Section 26 05 00.
   B. Provide switches, receptacles, and other wiring devices as indicated on drawings.

1.02 SUBMITTALS
   A. Submit product data for review.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
   A. Arrow Hart
   B. Eagle
   C. Hubbell
   D. Leviton
   E. Hubbell numbers are used unless otherwise noted, but products of equivalent quality by named manufacturers will be acceptable.

2.02 DEVICE COLORS
   A. Provide IVORY colored devices where available, unless otherwise noted.
   B. Provide RED colored devices where available when connected to the emergency power system, unless otherwise noted. If red devices are not available, use a black device with a red plate.

2.03 SWITCHES
   A. 20-Amp, 120/277 VAC, Heavy Duty, Specification Grade:
      1. Single Pole Toggle: Hubbell No. HBL1221I (normal), HBL1221R (emergency)

2.04 RECEPTACLES
   A. 20-Amp, 125 VAC:
      1. Duplex Type: Hubbell No. HBL5362I (normal), HBL5362R (emergency).
   B. Weatherproof Type Cover:
      1. Wet Location and Outdoors Exposed to Weather: Hubbell No. WP26E, WP26EH, or WP262EH.
3.01 INSTALLATION REQUIREMENTS

A. Install weather resistant receptacles in damp and wet locations.

B. Mounting:
   1. Mount switches 46" above the finished floor to center line of switch unless noted otherwise.
   2. Mount receptacles 18" above the finished floor to center line of receptacle unless noted otherwise.

C. Polarity: Wire receptacles so that the hot wire, neutral wire and ground wire connect to the proper terminals.

D. Wiring: Spade type insulated terminals shall be used on stranded wire. Feed thru feature shall not be used. Feed thru circuits shall be connected using proper wire nuts with a jumper wire connection to receptacle.

E. Terminal Connection: Push-in type wire connections shall not be used. All terminations shall be made using the screw terminals with proper torque.

F. Grounding: Install a No. 12 green ground wire from device grounding terminal back to grounding bus in panelboard.

G. Install receptacles with ground pin up.

H. In renovation and/or addition projects, if existing receptacles are not installed with ground pin up, request a ruling from the Designer.

I. For GFCI receptacles, do not utilize feed-thru feature, unless indicated so by drawings. If feed-thru is used, all downstream receptacles must have a GFCI Protected label on them.

J. The push in connection shall not be used. All connections shall be made using screw type terminals.

K. Where stranded wire is used, proper sized, spade type, insulated terminals shall be used.

L. A single receptacle installed on an individual branch circuit shall have an ampere rating of not less than that of the branch circuit.

END OF SECTION
PART 1 - GENERAL

1.01 WORK INCLUDED
   A. Comply with the provisions of Section 26 05 00.
   B. Provide device plates on switches, receptacles and miscellaneous devices.

1.02 RELATED SECTIONS
   A. Section 26 27 26: Wiring Devices

1.03 SUBMITTALS
   A. Submit product data for review.

1.04 ACCEPTABLE MANUFACTURERS
   A. Arrow Hart
   B. Eagle
   C. Hubbell
   D. Leviton

1.05 PRODUCTS
   A. Provide cast alloy or stamped metal plates on surface mounted switches, receptacles, and other devices.

PART 2 - EXECUTION

2.01 INSTALLATION REQUIREMENTS
   A. Install device plates in full contact with wall surface. Plates shall not project out from the wall.
   B. Install device plates in full contact with surface mounted box. Plates shall not project out from the edge of the box.

END OF SECTION
PART 1 - GENERAL

1.01 WORK INCLUDED

A. Comply with the provisions of Section 26 05 00.

B. Provide safety switches with the number of poles and fuses as shown on the drawings and/or as required by the National Electrical Code.

1.02 SUBMITTALS

A. Submit product data for review.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Square D

B. General Electric

C. Eaton/Cutler-Hammer

D. Siemens Energy Automation

2.02 CONSTRUCTION

A. Switches shall be heavy duty, 240 or 600 volt, horsepower rated, quick make, quick break, fusible type.

B. Switches shall have arc shields, be of enclosed construction with lugs suitable for 75 degrees C copper or aluminum conductors.

C. Switches shall have the number of poles as shown or as required by the application.

D. Switches shall have a factory installed equipment grounding lug kit. Switches shall be lockable in the open, (off) or closed (on) position.

E. Switches shall have close and withstand rating, switch interrupting rating, and fuse interrupting rating as required by the application, load current, and short circuit current available at the point of use.

F. Enclosure shall be NEMA 1 for general indoor use, NEMA 12 for dusty locations, NEMA 4 for damp and wet locations and outdoor use.

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Install a safety switch at all remote motor locations as indicated on drawings and/or as required by NEC Article 430.

B. Identify safety switches with Bakelite nameplates in accordance with Section 26 05 00.
C. Switch shall be installed within sight of the controller and/or the motor as required by NEC Article 430.102.

END OF SECTION
PART 1 - GENERAL

1.01 WORK INCLUDED
   A. Motor starters
   B. Provide wiring in accordance with Section 26 05 00.

1.02 RELATED SECTIONS
   A. Division 23: HVAC
   B. Section 26 05 19: Low Voltage Electrical Power Conductors
   C. Section 26 05 33: Raceways and Conduit Systems
   D. Section 26 05 53: Identification for Electrical Systems

1.03 SUBMITTALS
   A. Submit product data for review.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
   A. Allen Bradley
   B. Eaton
   C. General Electric
   D. Siemens Automation
   E. Square D

2.02 STARTERS
   A. Design: NEMA Standard, UL listed and CSA approved.
   B. Ratings: A/C symmetrical ratings of 50,000 amps for 460 volt equipment and 35000 amps for equipment of lower voltages. Provide higher ratings where available fault current exceeds these ratings and as called for on drawings.
   C. Size: In accordance with NEMA Standards.
   D. Provide the number of auxiliary contacts as required as required for proper system operation including all necessary interlock wiring. A minimum of one NO and one NC contacts in addition to the seal in contact shall be provided.
   E. Starters shall include solid state, adjustable overloads in each phase with loss of phase protection. The relays shall be Class 20 unless noted otherwise on the drawings and/or power system study.
F. Provide starters mounted in NEMA 1 general purpose enclosures, unless location of starter dictates other NEMA enclosure. For example, provide NEMA Type 12 for dusty locations and NEMA Type 4 enclosures for damp or wet locations, indoor or outdoor use.

G. Provide Hand-Off-Automatic selector switches in each starter.

H. Provide 120 volt control transformers in each starter, individually fused from the line side of the starter using two cartridge fuses and one fuse in the secondary. Size transformers to carry the holding coil circuit and other connected devices.

I. Provide lockable combination starters with motor circuit protectors sized in accordance with the NEC Article 430.

J. Manual Motor Controller:
   1. The controller shall be marked with a horsepower rating equal to or greater than the motor nameplate rating.
   2. Provide melting alloy type overload relays sized per the motor nameplate full load current.
   3. Provide controller mounted in NEMA 1 general purpose enclosures, unless location of controller dictates other NEMA enclosure. For example, provide NEMA Type 12 for dusty locations and NEMA Type 4 enclosures for damp or wet locations, indoor or outdoor use.

K. Motor Rated Switch:
   1. The switch shall be marked with a horsepower rating equal to or greater than the motor nameplate rating.
   2. Provide a NEMA 1 enclosure with a padlocking provision.

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Install motor starters in accordance with manufacturer's recommendations and requirements of NEC.

B. Adjust thermal overloads at system startup to motor nameplate full load current in accordance manufacturer's recommendation for specific application.

C. Connect Division 23 equipment ready for operation.

D. Coordinate equipment locations and starter sizes with Division 23 Contract Documents, submittals, and shop drawings.

E. Verify phase rotation of motors with Division 23.

F. Identify starters and controls as required by Section 26 05 00.

END OF SECTION
SECTION 263600
TRANSFER SWITCHES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Comply with provisions of Section 26 05 00.

B. This Section includes transfer switches rated 600 V and less. Refer to drawings for quantity, rating and configuration of transfer switches. Configurations include the following:
   1. Automatic transfer switches  
   2. 3-pole and 4-pole transfer switches  
   3. Closed or open transition switches  
   4. Delayed transition (programmed neutral) switches

C. This section includes a remote annunciation system for monitoring all switches.

D. Provide transfer switches together as a complete functioning system through a single vendor.

1.02 RELATED SECTIONS

A. Section 26 05 53: Identification for Electrical Systems

1.03 REFERENCES

A. The equipment and components in this specification shall be designed and manufactured according to latest revision of the following standards (unless otherwise noted).
   1. UL 1008: Underwriters Laboratories Standard for Automatic Transfer Switches
   2. NFPA 70: National Electrical Code including use in Emergency and Standby Systems in accordance with Articles 517, 700, 701, 702
   7. NEMA ICS10: AC Automatic Transfer Switch Equipment
   8. UL 50/508: Enclosures

1.04 SUBMITTALS

A. Submit the following:
   1. Product data: Product data sheets for each switch including rated capacities, weights, operating characteristics, furnished specialties and accessories.
   2. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.
   3. Single-Line Diagram: Show connections between transfer switch, bypass/isolation switch, power sources and load showing interlocking provisions for each combined transfer switch and bypass/isolation switch.
   4. Features and operating sequences, both automatic and manual.
   5. Field quality-control test reports.

1.05 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
1.06 OPERATION AND MAINTENANCE DATA
   A. Provide minimum six (6) copies of installation, operation and maintenance procedures to owner in accordance with general requirements of Division 01 and Division 26.
   B. Submit operation and maintenance data based on factory and field testing, operation and maintenance of specified product. Include factory setting of relays, relay setting, and calibration instructions.

1.07 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a response period of less than eight hours from time of notification.
   B. Source Limitations: Obtain transfer switches, annunciators and other equipment defined in this section through one source from a single manufacturer.
   C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.08 DELIVERY, STORAGE AND HANDLING
   A. Transfer switches shall be provided with adequate lifting means and shall be able to be rolled or moved into installation position and bolted directly to floor without using floor sills.
   B. Deliver, store, protect, and handle products in accordance with recommended practices listed in manufacturer's installation and maintenance manuals.
   C. Inspect and report concealed damage to carrier within specified time.
   D. Store in a clean, dry space. Maintain factory protection or cover with heavy-duty plastic, minimum 6 mil, to keep out dirt, water, construction debris, and traffic. Heat enclosures to prevent condensation.
   E. Handle transfer switches in accordance with manufacturer's written instructions to avoid damaging equipment, installed devices, and finish. Lift only by installed lifting provisions.

1.09 PROJECT CONDITIONS (SITE ENVIRONMENTAL CONDITIONS)
   A. Follow applicable NEMA, ANSI, and NECA standard practices before, during, and after installation.
   B. Transfer switches shall be located in well-ventilated areas, free from excess humidity, dust, and dirt and away from hazardous materials. Ambient temperature of area will be between minus [30] and plus [40] degrees C. Indoor locations shall be protected to prevent moisture from entering enclosure.

1.10 SEQUENCING AND SCHEDULING
   A. Provide a written detailed description of scheduled installation, testing, and startup dates.

1.11 WARRANTY
   A. Manufacturer warrants equipment to be free from defects in materials and workmanship for 1 year from date of installation or 18 months from date of delivery, whichever occurs first.
1.12 EXTRA MATERIALS

A. Provide spare parts as recommended by manufacturer and as indicated on the drawings.

B. Provide a complete set of spare fuses of all sizes and ratings used in the switches.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Emerson; ASCO Power Technologies, LP
   2. GE Zenith Controls
   3. Onan/Cummins Power Generation; Industrial Business Group
   4. Russelectric, Inc.
   5. Eaton/Cutler-Hammer

2.02 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Switch Ratings: Refer to drawings for transfer switch types, voltage rating and current rating.

B. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch amperes rating, unless otherwise indicated.

C. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
   1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.

D. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

E. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

F. Electrical Operation: Accomplish by a non-fused, momentarily energized solenoid, electric-motor-operated mechanism, or electrically operated circuit breakers, mechanically and electrically interlocked in both directions.

G. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
   1. Switch Action: Double action; mechanically held in both directions.
   2. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units rated 225A and higher, shall have separate arcing contacts.

H. Neutral Switching: Where four-pole switches are indicated, provide fully rated neutral contact on same operating mechanism as phase contacts.

I. Neutral Terminal: Where three pole switches are indicated on the drawings, provide a solid and fully rated neutral, unless otherwise indicated.
J. Motor Loads: For switches that serve motor loads, furnish one of the following (match existing switch configuration):
1. Open transition transfer switch with in-phase monitor
2. Closed transition transfer switch with in-phase monitor
3. Delayed transition transfer switch

K. Indicating Lights: All indicating lights on front of transfer switch to be LED type.

L. Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with existing remote device.

M. Factory Wiring: Train and bundle factory wiring and label consistent with Shop Drawings, either by color-code or by numbered or lettered wire and cable tape markers at terminations. Color-coding and wire and cable tape markers are specified in Division 26 Section "Electrical Identification."
1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.

N. Enclosures: General-purpose NEMA 1 complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.03 MICROPROCESSOR CONTROLLER
A. Furnish a built-in microprocessor to provide sensing and logic for control of the switch with the ability to communicate serially through a serial communication module or Ethernet connectivity module.

B. Provide controller with 12 selectable nominal voltages for maximum application flexibility and minimal spare part requirements. Provide true RMS voltage sensing, accurate to + 1% of nominal voltage and frequency sensing accurate to + 0.2%. Provide controller capable of operating over a temperature range of -20 to +60 degrees C and storage from -55 to +85 degrees C.

C. Store default setup information and calibration data on nonvolatile EPROM.

D. Controller Display and Keypad: Provide a four-line, 20 character LCD display and 5 x 5, tactile keypad as an integral part of the controller for viewing all available data and setting desired operational parameters.

2.04 METERING
A. Provide a three phase digital ammeter with current transformers and shorting blocks. Sense current on the LOAD conductors.

B. Provide a three phase, digital voltmeter.

2.05 ELECTRONIC CIRCUIT MONITOR
A. Provide electronic circuit monitors on all switches unless otherwise noted. The monitor shall be accurate to 0.075% of reading plus 0.025% of full scale for voltage and current sensing, and 0.15% of reading plus 0.025% of full scale for power and energy, accurate through the 63rd harmonic.
1. These accuracies shall be maintained for both light and full loads.
2. No annual recalibration by users shall be required to maintain these accuracies.
3. Voltage and current for all phases shall be sampled simultaneously to assure high accuracy.

B. The circuit monitors shall be UL listed per UL 508, CSA recognized under C22.2, CE compliant, and tested for EMC in accordance with the IEC 1000-2, 1000-4, 1000-5 series of electrical tests (level 4), FCC compliant per FCC Part 15, Class A, and vibration and temperature tested. The meter module shall be rated for an operating temperature range of -25 degree C to 70 degree C.

C. The circuit monitor metering inputs shall utilize current transformers for the current inputs. It shall be rated 5A nominal and 10A full scale. In addition, it shall be industrially and utility hardened to have an overload withstand rating of 15A continuous and 500A for 1 second.

D. The device shall not require potential transformers or control power transformers when applied at 600V or less. The data monitor shall accept control power over a range of 100-415Vac, 50, 60, or 400 Hz, or 100-300Vdc.

E. The monitor shall be capable of interfacing with an optional communications module to permit information to be sent to a central location for display, analysis and logging.

F. All information shall be available from the display or via RS-485 Ethernet or other industry standard open communications protocol. It shall be possible to perform the setup via the display. No dip switches or other hardware adjustments shall be required for setup.

G. Circuit monitors shall be equipped with a backlit, LCD display capable of displaying three phases and neutral values at the same time.

H. Circuit monitors shall provide diagnostics to troubleshoot mis-wired installations.

I. Position of the transfer switch shall be monitored using (2) discrete inputs provided on the data monitor.

J. The information, capabilities, and metered values provided by the data monitor shall include the following:
   1. Current, per-phase
   2. Neutral current measurements
   3. Voltage, phase-to-phase and phase-neutral
   4. Real Power (kW), per phase and three-phase total
   5. Reactive Power (kVAR), per phase and three phase total
   6. Apparent Power (kVA), per phase and three phase total
   7. Power Factor (true), per-phase and three-phase total
   8. Frequency readings
   9. Real Energy (kWh), three phase total
   10. Reactive Energy (kVARh), three phase total
   11. Apparent Energy (kVAh), three phase total
   12. Energy Accumulation modes, signed, absolute, energy in, energy out
   13. Demand Current, per phase and neutral, present and peak
   14. Real Power Demand (kVARd) readings, three phase total, present and peak
   15. Reactive Power Demand (kVARd) readings, three phase total, present and peak
   16. Apparent Power Demand (kVAd) readings, three phase total, present and peak
   17. Total Harmonic Distortion (THD) readings, voltage and current, per phase
   18. Date and time stamping, peak demands, power up/restart and resets
   19. Onboard alarms for over/under voltages (per phase L-L, L-N), over/under currents (per phase, neutral), over/under frequency, current unbalance (per phase), and voltage unbalance (per phase L-L, L-N)
   20. Minimum and maximum readings - I,V,F,PF
   21. 800K Onboard memory provided
22. Advanced demand calculations shall include:
   a. User defined demand intervals
   b. User defined sliding or rolling block demand
   c. Synchronization of demand interval to utility pulse
   d. Predicted power demand for real, reactive and apparent power

23. Relay output capability provided

2.06 AUTOMATIC TRANSFER SWITCHES

A. Comply with Level 1 equipment according to NFPA 110.

B. Switching Arrangement: Double-action type, incapable of pauses or intermediate position stops during normal functioning, except for delayed transition switches. Provide open, closed or delayed transition switches as indicated on drawings.

C. Manual Switch Operation:
   1. Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.
   2. Unloaded, control circuit automatically disconnects from electrical operator during manual operation.

D. Automatic Closed-Transition Transfer Switches: Include the following functions and characteristics:
   1. Fully automatic make-before-break operation.
   2. Load transfer without interruption, through momentary interconnection of both power sources not exceeding 100 ms.
   3. Initiation of No-Interruption Transfer: Controlled by in-phase monitor and sensors confirming both sources are present and acceptable.
      a. Initiation occurs without active control generator.
      b. Controls ensure that closed-transition load transfer closure occurs only when the 2 sources are within plus or minus 5 electrical degrees maximum, and plus or minus 5 percent maximum voltage difference.
   4. Failure of power source serving load initiates automatic break-before-make transfer.
   5. If transfer does not take place within selected time frame (5 - 60 minutes) switch to revert to open transition with delay mode.

E. Delayed Transition Switch: Switch operator has a programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time-controlled pause at midpoint during transfer. Pause is adjustable from 0.5 to 30 seconds minimum and factory set for 0.5 second, unless otherwise indicated. Time delay occurs for both transfer directions. Pause is disabled unless both sources are live.

F. Automatic Transfer-Switch Features:
   1. Undervoltage Sensing for Each Phase of Normal Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pick at 90 percent and dropout at 85 percent.
   2. In-Phase Monitor: Provide in-phase monitors on all automatic switches except for delayed transition switches, unless otherwise indicated on drawings. Factory-wired, internal relay controls transfer so it occurs only when the two sources are synchronized in phase. Relay compares phase relationship and frequency difference between normal and emergency sources and initiates transfer when both sources are within 10 electrical degrees, and only if transfer can be completed with 60 electrical degrees. Transfer is initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.
3. **Adjustable Time Delay**: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.

4. **Voltage/Frequency Lockout Relay**: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.

5. **Time Delay for Retransfer to Normal Source**: Adjustable from 0 to 30 minutes, and factory set for 10 minutes. Switch set to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.

6. **Test Switch**: Simulate normal-source failure.

7. **Switch-Position Pilot Lights**: Indicate source to which load is connected.

   a. **Normal Power Supervision**: Green light with nameplate engraved “Normal Source Available.”

9. **Digital Communication Interface**: Matched to capability of remote annunciator or annunciator and control panel.

10. **Signal-Before-Transfer Contacts**: Two sets of normally open/normally closed dry contacts, one that operates in advance of retransfer to normal source and one the operates in advance of transfer to emergency source in the test mode. Interval is adjustable from 1 to 30 seconds.

11. **Unassigned Auxiliary Contacts**: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.

12. **Transfer Override Switch**: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.

13. **Load shed feature**: Provide for a load shed input signal from the generator control system to allow for programmed load shedding.

14. **Engine Starting Contacts**: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.

15. **Engine Shutdown Contacts**: Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.

16. **Engine Shutdown Contacts**: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.

17. **Engine-Generator Exerciser**: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory settings are for 7-days exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
   a. **Exerciser Transfer Selector Switch**: Permits selection of exercise with and without load transfer.
   b. **Push-button programming control with digital display of settings**.
   c. **Integral battery operation of time switch when normal control power is not available**.

### 2.07 REMOTE ANNUNCIATOR SYSTEM

#### A. Functional Description:
Remote annunciator panel shall annunciate conditions for indicated transfer switches. Annunciation shall include the following:

1. **Sources available**, as defined by actual pickup and dropout settings of transfer-switch controls.
2. **Switch position**.
3. **Switch in test mode**.
4. Failure of communication link.

B. Annunciator Panel: LED-lamp type with audible signal and silencing switch.
   1. Indicating Lights: Grouped for each transfer switch monitored.
   2. Label each group, indicating transfer switch it monitors, location of switch, and identity of load it serves.
   3. Mounting: Flush, modular, steel cabinet, unless otherwise indicated.
   4. Lamp Test: Push-to-test or lamp-test switch on front panel.

C. Locate remote annunciator where shown on drawings.

2.08 SOURCE QUALITY CONTROL

A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Floor-Mounting Switch: Anchor to floor by bolting.

B. Annunciator and Control Panel Mounting: Flush in wall, unless otherwise indicated.

C. Identify components according to Section 26 05 53.

D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

E. Furnish and install all necessary interconnecting control and monitoring wiring between switches, generators, annunciators and elevator controllers as required for a complete operating system.

3.02 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.

B. Ground equipment according to Section 26 05 26.

3.03 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections and prepare test reports.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.
   2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
   4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test...
voltages and procedure recommended by manufacturer. Comply with manufacturer’s specified minimum resistance.
a. Check for electrical continuity of circuits and for short circuits.
b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
c. Verify that manual transfer warnings are properly placed.
d. Perform manual transfer operation.

5. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.
a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
b. Simulate loss of phase-to-ground voltage for each phase of normal source.
c. Verify time-delay settings.
d. Verify pickup and dropout voltages by data readout or inspection of control settings.
e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
f. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
g. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

a. Verify grounding connections and locations and ratings of sensors.

C. Coordinate tests with tests of generator and run them concurrently.

D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

E. Remove and replace malfunctioning units and retest as specified above.

3.04 DEMONSTRATION

A. Engage a factory-authorized service representative for a minimum 2 days to train Owner’s maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.

B. Coordinate this training with that for elevator equipment.

END OF SECTION
SECTION 280500

COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Basic materials and methods, along with Division 1, General Provisions that are applicable to
Division 28 Sections.

B. Drawings and general provisions of the contract, including General and Supplementary
Conditions and Division 1 specification Sections apply to all Division 28 Sections.

1.02 QUALITY ASSURANCE

A. Comply with applicable local, state, and federal codes.

B. Warrant Work against faulty material or Workmanship in accordance with Division 1. If the Project
is occupied or the systems placed in operation in several phases at the request of the Owner's
Representative, then the warranty of each system or piece of equipment used, shall begin on the
date each system or piece of equipment was placed in satisfactory operation and accepted as
such, in writing, by the Owner's Representative. The use of building equipment for temporary
service and testing does not constitute the beginning of the warranty.

C. Equipment and material provided under this Division shall be periodically inspected and serviced
by competent technicians. This function becomes the responsibility of the Owner's
Representative when the system is accepted by the Owner's Representative. The one year
material and Workmanship warranty is not intended to supplant normal inspection or service and
shall not be construed to mean the Contractor shall provide free service for normal maintenance
items due to normal use, nor to correct without charge, breakage, maladjustment, and other
trouble caused by improper maintenance.

D. Upon completion of contract and progressively as work proceeds, clean-up and remove dirt,
debris and scrap materials. Maintain premises neat and clean. Protect and preserve access to
energized equipment at all times. Clean items with factory finishes. Touch-up minor damage to
surfaces; refinish entire piece of equipment when sustained major damage. Use only factory
supplied paints of matching color and formula. Schedule an off-hour shutdown of all electrical
system equipment during the 2-week period preceding substantial completion.

1.03 REFERENCES

A. Perform Work specified in Division 28 in accordance with standards listed below of the latest
applicable edition adopted by the authority having jurisdiction. Where these Specifications are
more stringent, they shall take precedence. In case of conflict, obtain a decision from the
Designer.

1. NFPA 70: National Electrical Code
3. NFPA 92A: Standard for Smoke Control Systems Utilizing Barriers and Pressure
   Differences
5. NFPA 110: Standard for Emergency and Standby Power Systems
6. ANSI Handicapped Code-A117.1
7. SBC: Standard Building Code
8. All applicable Occupational Safety and Health Administration (OSHA) Publications, Rules
   and Regulations
9. Americans with Disabilities Act (ADA)
11. U.L. Fire Resistance Index

1.04 RELATED WORK SPECIFIED UNDER OTHER DIVISIONS

A. Field painting, except such painting as is required to maintain shop coat painting and factory finish painting.

B. Flashing of conduits into roofing and outside walls.

C. Heating, ventilating, and air conditioning equipment.

D. Fireproofing

E. Cutting and patching for Work, except for errors and omissions under this Division.

1.05 SUBMITTALS

A. Comply with provisions of Division 01.

B. Submit product data, equipment details, capacities, and shop drawings as specified in sections of this Division.

1.06 OPERATING AND MAINTENANCE MANUALS

A. Provide manuals in accordance with Division 01.

B. In addition to required submittals, include copies of all test reports required in Part 3, "Execution" of Section 26 05 00.

C. Provide completed warranty certificates for systems and equipment.

D. Provide tabulation of overload heaters, including each motor identified, nameplate data and overload heater part number.

1.07 DELIVERY AND STORAGE

A. Insofar as possible, deliver items in manufacturer's original unopened packaging. Where this is not practical, cover items with protective materials to keep them from being damaged. Use care in loading, transporting, unloading, and storage to keep items from being damaged.

B. Store items in a clean dry place and protect from damage. Evidence of damage from water or other contaminants will be cause for rejection.

1.08 RECORD DRAWINGS

A. Comply with provisions of Division 01.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Equipment and materials furnished shall be listed by UL or other nationally accredited testing laboratory where available. When listing is not available for a piece of equipment, it shall be submitted in accordance with Drawings and Specifications and shall be approved by the authorities having jurisdiction.
B. Specifications and Drawings indicate name, type and/or catalog number of materials and equipment to establish standards of quality. Submittals shall be based on the standards specified. The standards should not be construed as limiting competition.

C. If materials and equipment other than specified herein are intended to be submitted, a letter providing a list of all the suggested alternates by section number, brand and series or model shall be submitted to the prime Designer for review and approval. Submit in accordance with Division 01 or 14 days prior to bids or final pricing are to be submitted.

2.02 WALL AND CEILING ACCESS PANELS

A. Style and type as required for material in which installed.
   1. Size: 16" X 16" minimum, as indicated, or as required to allow inspection, service and removal of items served.
   2. 14-gauge minimum sheet metal for doors, 16-gauge frames of cadmium-plated or galvanized construction. Doors shall have expanded plaster rings where located in plaster walls or flanged finish where located in drywall or block construction.
   3. Panels shall have spring hinges with screwdriver locks in non-public areas. Key lock, keyed alike, for panels in public areas.
   4. Prime painted or rust inhibitive paint finish.
   5. UL labeled when in fire-rated construction, 1 1/2 hour rating.
   6. Provide in walls, floors, and ceilings to permit access to all equipment and junction boxes.
   7. Furnish and locate access panels under this Division. Coordinate with trades who are responsible for building system in which panels are to be installed.
   8. Acceptable Manufactures: Milcor, Nystrom, Karp, J.L. Industries or Williams Brothers. Use panels equal to Milcor Style M for masonry and drywall construction; equal to Milcor Style K for plastered masonry walls and ceilings. Stainless steel panels shall be used in ceramic tile or glazed structural tile.

PART 3 - EXECUTION

3.01 COORDINATION

A. Install equipment in accordance with manufacturer's recommendations. Where conflicts occur between Contract Documents and these recommendations, request a ruling before proceeding with such Work.

B. Visit site and observe conditions under which work must be performed. No subsequent allowance will be made because of error or failure to obtain necessary information to completely estimate and perform work required by these documents.

C. Examine Specifications and Drawings to be familiar with items which require system connections and coordination. Electrical Drawings are diagrammatic and shall not be scaled for exact sizes.

D. Prior to commencement of installation, prepare coordination drawings for work under this division, as specified in Division 01 and as called for herein. Coordinate work in full cooperation with persons performing work under other divisions, including but not limited to mechanical, plumbing, fire protection, telecommunication and miscellaneous steel to develop these coordination drawings that will serve as the agreed upon plan for a coordinated installation of work for all trades. Include system equipment, conduit racks and conduits 3" and larger on drawings confirming coordination with other trades. Incorporate the information onto the coordination drawings required under Divisions 01, 23, 26, and 28 to develop master coordination drawings. Account for lighting fixture depths in the coordination. Inform Designer of conflicts that cannot be resolved.

E. Drawings are not to be submitted to Engineer. Submit a copy to the General Contractor and keep a copy on site for references. Notify design professional of conflicts that cannot be resolved.
3.02 FEES AND PERMITS
   A. Obtain and pay for all necessary permits and inspection fees required for electrical installation.

3.03 DEMOLITION
   A. Visit the site before submitting a bid to observe existing conditions.
   B. Work in existing buildings shall be scheduled well in advance with the Owner. Work shall be performed at such times and under such conditions as suit the convenience of the Owner. Plan the Work to minimize disruption of normal operations. Notify Owner before any circuit is de-energized in occupied areas.

3.04 CUTTING AND PATCHING
   A. Comply with provisions of Division 01.
   B. Repair or replace routine damage caused by cutting in performance of Work under this Division.
   C. Correct unnecessary damage caused due to installation of electrical Work, brought about through carelessness or lack of coordination.
   D. Holes cut through floor slabs shall be core drilled with drill designed for this purpose. All openings, sleeves, and holes in slabs between floors shall be properly sealed, fire-proofed and water-proofed.
   E. Holes cut through walls shall be drilled or cut with tools designed for the purpose. All openings, sleeves and holes in walls that extend to underside of floor above shall be properly sealed and fire-proofed.
   F. Repairs shall be performed with materials which match existing materials and be installed in accordance with appropriate sections of these Specifications.
   G. Contractor shall not be permitted to cut or modify any structural members without the written permission of the Designer.

END OF SECTION