# **TECHNICAL PROVISIONS** VOLUME I OF II

# **TERMINAL BUILDING EXPANSION**

BID NO. PUR - 1410 FAA AIP. 3-24-0019-059-2018 (DESIGN) MAA-GR-19-009 (DESIGN)



# HAGERSTOWN REGIONAL AIRPORT – RICHARD A. HENSON FIELD HAGERSTOWN, MD

**Prepared For:** 

## THE BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY MARYLAND

Prepared By:



**MARCH 2019** 

**BID DOCUMENTS** 

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#### BID NO. PUR-1410 AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN) INVITATION TO BID ISSUED ON BEHALF OF THE BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY, MARYLAND BY THE WASHINGTON COUNTY PURCHASING DEPARTMENT 100 WEST WASHINGTON STREET, ROOM 3200 HAGERSTOWN, MD 21740-4748 PHONE: 240-313-2330 / FAX: 240-313-2331

#### DATE ISSUED: March 29, 2019

#### HAGERSTOWN REGIONAL AIRPORT TERMINAL BUILDING EXPANSION

PRE-BID CONFERENCE DATE/	
TIME AND LOCATION:	Wednesday, May 15, 2019 at 1:30 P.M., (EDST) Hagerstown Regional Airport Terminal Conference Room 18434 Showalter Road Hagerstown, MD 21742
DEADLINE FOR QUESTIONS:	No later than 4:00 P.M. (EDST), Wednesday, May 22, 2019
SUBMIT BIDS TO:	Washington County Purchasing Department Washington County Administration Complex 100 West Washington Street Third Floor, Room 3200 Hagerstown, MD 21740
BID SUBMISSION DEADLINE AND BID OPENING TIME:	No later than 2:00 P.M., (EDST), Wednesday, June 5, 2019
<b>BID OPENING LOCATION:</b>	Washington County Administration Complex Third Floor Conference Room 3000 100 West Washington Street Hagerstown, MD 21740

If indicated below ( $\sqrt{}$ ) and not waived by the County, Bidders shall be required to provide the following:

 $\sqrt{}$  A Bid Bond, in the amount of five (5%) percent of the bid on a bid of \$100,000 or more for construction contracts. See "Bid Bonds – Section 2" of the General Conditions and Instructions to Bidders.

 $\sqrt{}$  A Performance Bond for a bid award of \$100,000 or more on construction contracts. See "Bid Bonds – Section 2" of the General Conditions and Instructions to Bidders.

 $\sqrt{}$  A Labor and Material Bond for a bid award of \$100,000 or more on construction contracts. See "Bid Bonds – Section 2" of the General Conditions and Instructions to Bidders.

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#### TERMINAL BUILDING EXPANSION HAGERSTOWN REGIONAL AIRPORT-RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN)

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#### TERMINAL BUILDING EXPANSION HAGERSTOWN REGIONAL AIRPORT-RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN)

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#### TERMINAL BUILDING EXPANSION HAGERSTOWN REGIONAL AIRPORT-RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN)

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#### PURCHASING DEPARTMENT DIVISION OF BUDGET & FINANCE 100 West Washington Street, Room 3200 | Hagerstown, MD 21740-4748 | P: 240.313.2330 | F: 240.313.2331 www.washco-md.net

### PUR-1410 INVITATION TO BID TERMINAL BUILDING EXPANSION AT HAGERSTOWN REGIONAL AIRPORT – RICHARD A. HENSON FIELD

The Board of County Commissioners of Washington County, Maryland will accept sealed bids for the **Terminal Building Expansion at Hagerstown Regional Airport – Richard A. Henson Field**. Bid documents are available immediately from the Washington County website: <u>www.washco-md.net</u> by accessing the "Division & Departments/Purchasing Department/Open Invitations" or may be obtained in the Washington County Purchasing Department, Washington County Administration Complex, 100 West Washington Street, Third Floor, Room 3200, Hagerstown, MD 21740. Direct all inquiries to Rick Curry, CPPO, Director of Purchasing at telephone 240-313-2330 or fax 240-313-2331.

All bids must be enclosed in a sealed opaque envelope marked "SEALED BID – (PUR-1410) Terminal Building Expansion at Hagerstown Regional Airport – Richard A. Henson Field" and be received and time stamped by the Washington County Purchasing Department, Washington County Administration Complex, 100 West Washington Street, Third Floor, Room 3200, Hagerstown, Maryland, 21740, no later than time: 2:00 P.M., (EDST) on Wednesday, June 5, 2019 after which time they will be publicly opened in Conference Room 3000, at the address mentioned above. All interested parties are invited to be present.

A Pre-Bid Conference will be held on **Wednesday**, May 15, 2019 at 1:30 P.M. (EDST) at the Hagerstown Regional Airport – Richard A. Henson Field 18434 Showalter Road, Hagerstown, Maryland. All interested bidders are requested to be present. Attendance is not mandatory but is strongly encouraged.

<u>NOTE</u>: All Bidders must enter the Washington County Administrative Complex through either the front door at the 100 West Washington Street entrance or through the rear entrance (w/blue canopy roof) which is handicap accessible and must use the elevator to access the Purchasing Department to submit their bid. Alternate routes are controlled by a door access system. Washington County Government has announced new security protocols being implemented at the Washington County Administrative Complex at 100 West Washington Street, Hagerstown. The new measures took effect Tuesday, February 14, 2017. The general public will be subject to wand search and will be required to remove any unauthorized items from the building prior to entry. Prohibited items include but are not limited to: Weapons of any type; Firearms, ammunition and explosive devices; Cutting instruments of any type including knives, scissors, box cutters, work tools, knitting needles, or anything with a cutting edge, etc.; Pepper spray, mace or any other chemical defense sprays; and Illegal substances.

Washington County shall make positive efforts to utilize Disadvantaged Business Enterprises for its supplies and services and shall allow these sources to maximum feasible opportunity to compete for contracts. The Board of County Commissioners does not discriminate on the basis of race, color, national origin, sex, religion, age and disability in employment or the provision of services. Individuals requiring special accommodations are requested to contact 240-313-2330 Voice, TTY Dial 711 to make arrangements no later than five (5) calendar days prior to the Pre-Bid Conference.

Funding for the Terminal Building Expansion is anticipated through the Federal Aviation Administration (FAA) Airport Improvement Program (AIP). FAA required contract provisions include but are not limited to the following provisions referenced here: Buy American Preference, Civil Rights – Title VI Assurances, Davis Bacon Requirements, Debarment and Suspension, Disadvantaged Business Enterprise, Foreign Trade Restriction, Lobbying Federal Employees and Recovered Materials.

The Board of County Commissioners of Washington County, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 USC §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders or offerors that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

For Contracts that exceed \$10,000.00, the Affirmative Action Requirements are as follows:

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

### Timetables

Goals for minority participation for each trade: 9.72%

Goals for female participation in each trade: 6.9%

These goals are applicable to all of the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a) and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs (OFCCP) within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this notice and in the contract resulting from this solicitation, the "covered area" is Maryland, Washington County, Hagerstown.

The Board of County Commissioners of Washington County, Maryland, reserves the right to accept or reject any or all bids and to waive formalities, informalities and technicalities therein. The Board reserves the right to contact a Bidder for clarifications and may, at its sole discretion, allow a Bidder to correct any and all formalities, informalities and technicalities in the best interest of Washington County.

By Authority of:

Rick Curry, CPPO Director of Purchasing

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# **SECTION 1 BID DOCUMENTS**

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#### BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY, MARYLAND

#### GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS

#### INTRODUCTION

The general rules and conditions which follow, along with all other documents consisting of this "Bid Document," apply to all purchases and become a definite part of each formal invitation to bid, purchase order, contract, or other award issued by the Washington County's Director of Purchasing (hereinafter "Director of Purchasing"), unless otherwise specified. Bidders or their authorized representatives are expected to fully inform themselves as to the conditions, requirements, and specifications before submitting bids; failure to do so will be at the Bidder's own risk and they cannot secure relief on the plea of error. Bidders are advised that all costs related to preparing and/or submitting a Bid or Proposal shall be borne by the Bidder.

Satisfactory evidence of authority to bind the firm by the person signing the Bid when submitted by partnerships or corporations may be requested by the County prior to making any award. Anyone signing a Bid as an agent shall include evidence of his/her authority to do so.

Subject to Maryland State and Washington County, Maryland (hereinafter "County") laws and all rules, regulations and limitations imposed by legislation of the Federal Government, bids on all advertisements and invitations issued by the Washington County Purchasing Department shall bind bidders to applicable conditions and requirements set forth herein unless otherwise specified in the Invitation to Bid. Should there be a conflict in laws between states, State of Maryland law shall prevail.

Should there be a conflict between the general bid conditions and the supplemental bid conditions (if any), the supplemental bid conditions shall prevail.

#### **GENERAL CONDITIONS OF BIDDING**

- 1. Bids Binding for One Hundred and Twenty (120) Days: Unless otherwise specified all formal bids submitted shall be binding for one hundred and twenty (120) calendar days following bid opening date, unless the bidder, upon request of the Director of Purchasing, agrees to an extension.
- 2. Bids for All or Part: Unless otherwise specified by the County or by the Bidder, the County reserves the right to make award on all items, or on any of the items according to the best interests of the County. Bidder may restrict his/her bid to consideration in the aggregate by so stating but should name a unit price on each item bid upon; any bid in which the bidder names a total price for all the articles without quoting a price on each and every separate item, may be rejected at the option of the County.
- **3. Catalogs:** Each Bidder shall submit where necessary or when requested by the Director of Purchasing, catalogs, descriptive literature, and detailed drawings, fully detailing features, designs,

construction, finishes and the like necessary to fully describe the materials or work they propose to furnish.

- 4. Collusive Bidding: The Bidder certifies that his/her bid is made without any previous understanding, agreement or connection with any person firm, or corporation making a bid for the same project, without unlawful prior knowledge of competitive prices, and is in all respects fair, without outside control, collusion, fraud or otherwise illegal action.
- 5. Competency of Bidder: No proposal shall be accepted from or contract awarded to any person, firm or corporation that is in arrears or is in default to Washington County upon any debt or contract, or that is a defaulter, as surety or otherwise, upon any obligation to said County, or had failed to perform faithfully any previous contract with the County. The Bidder, if requested, must present within forty-eight (48) hours evidence satisfactory to the Director of Purchasing of performance ability and possession of necessary facilities, pecuniary resources and adequate insurance to comply with the terms of these specifications and contract documents.

The successful Bidder shall actively cooperate in all matters pertaining to the proper compliance of this contract and shall come to the office of the Director of Purchasing whenever requested in connection with the performance of this contract.

The successful Bidder shall inform the Director of Purchasing of any and all circumstances which may impede the progress of the work or inhibit the performance of the contract including, but not limited to: bankruptcy, dissolution or liquidation, merger, sale of business, assignment, etc.

The County may examine the Bidder's and any first-tier subcontractor's records to determine and verify compliance with the contract. The Bidder and any first-tier subcontractor must grant the County access to these records at all reasonable times during the contract term and for three (3) years after final payment. If the contract is supported to any extent by Federal or State funds, the appropriate Federal or State authorities may also examine these records. The Bidder must include the preceding language of this paragraph in all first-time subcontracts.

- 6. **Completeness:** All information required by Invitation to Bid must be supplied to constitute a proper bid. The County shall not be responsible for the premature opening of Bids if not properly addressed or identified.
- 7. Conditional Bids: Qualified bids are subject to rejection in whole or in part.
- 8. Confidentiality: Firms shall give specific attention to the identification of those portions of their proposals that they deem to be confidential, proprietary information or trade secrets and provide any justification why such materials, upon request, should not be disclosed by the County under the Access to Public Records Act, State Government Article, Title 10, Sections 10-611 to 10-628, Annotated Code of Maryland.
- **9. Errors in Bids:** When an error is made in extending total prices, the written unit bid price shall govern. In the absence of written prices, the unit bid price shall govern. Carelessness in quoting

prices, or in preparation of bid, otherwise, will not relieve the Bidder. *Erasures or changes in bids must be initialed*.

#### 10. General Guaranty: Bidder agrees to:

- a. Save the County, its agents and employees harmless from liability of any nature or kind for the use of any copyrighted or uncopyrighted composition, secret process, patented or unpatented, invention, article or appliance furnished or used in the performance of the contract which the Bidder is not the patentee, assignee, licensee or owner.
- b. Protect the County against latent defective material or workmanship and to repair or replace any damages or marring occasioned in transit or delivery.
- c. Furnish adequate protection against damage to all work and to repair damages of any kind, to the building or equipment, to their own work or to the work of other contractors, for which their worker is responsible due to the negligence in the course and scope of the employment.
- d. Pay for all permits, licenses and fees and give all notices and comply with all laws, ordinances, rules and regulations of the County and State of Maryland.

#### 11. Illegal Immigrants:

- a. The Bidder shall comply with the Immigration and Nationality Act (INA) which includes provisions addressing employment eligibility, employment verification, and nondiscrimination. Under the INA, the Bidder may hire only persons who may legally work in the United States (i.e., citizens and nationals of the U.S.) and aliens authorized to work in the U.S. The Bidder shall verify the identity and employment eligibility of anyone employed or to be employed, including completion of the Employment Eligibility Verification Form (I-9). The Bidder shall establish appropriate procedures and controls to ensure that no services under this Contract will be performed by any worker who is not legally eligible to perform such services or for employment.
- b. Failure by the Bidder or his/her Sub-Contractors to comply with the provisions of Section 11.a. herein will be grounds for termination of the Contract.
- 12. Insurance: Liability insurance on all major divisions of coverage for each and every Bidder and subcontractor shall be required for the length of the contract. Bidder and subcontractor must supply evidence of insurance upon request. Each Bidder agrees to assist in every manner possible in the reporting and investigation of any accident, and upon request, agrees to cooperate with all interested insurance carriers in the handling of any claims by securing and giving evidence and obtaining the attendance of witnesses as required for any claim or suit. The Bidder shall be prepared to show evidence of insurance as required under Washington County's *Insurance Requirements for Independent Contractors Policy*, included herein, prior to the execution of any contract. The Bidder, if requested, shall provide the Certificate of Insurance to the Purchasing Department within ten (10) calendar days after receiving a request for it. Failure to provide an

acceptable Certificate of Insurance within the time frame stated above shall be cause to terminate the contract(s). The certificate shall state that such insurance is in force and cannot be cancelled or released except upon thirty (30) days prior written notice to the County. If any of the stated coverages expire during the term of this contract, the Bidder shall deliver renewal certificates to the County at least ten (10) calendar days prior to the expiration.

**13. Interpretations, Discrepancies, Omissions:** Should any Bidder find discrepancies in, or omissions from the documents or be in doubt of their meaning, he/she should at once request, in writing, an interpretation from:

Rick Curry, CPPO – Director of Purchasing Washington County Purchasing Department Washington County Administration Complex 100 West Washington Street, Room 3200 Hagerstown, MD 21740 FAX: 240-313-2331 or send questions in Microsoft Word platform via e-mail to: <u>purchasingquestions@washco-md.net</u>

All necessary interpretations will be issued to all Bidders in the form of addenda to the specifications, and such addenda shall become part of the contract documents. Exceptions as taken in no way obligates the County to change the specifications. Failure of any Bidder to receive any such addendum or interpretation shall not relieve such Bidder from any obligation under his/her bid as submitted. The County shall assume no responsibility for oral instructions or suggestions. <u>ORAL ANSWERS WILL NOT BE BINDING ON THE COUNTY</u>. Requests received after 4:00 P.M. on the date included in the Supplemental Terms and Conditions may not be considered.

- **14.** Landfill Tipping Fees: Disposal of items shall be at an approved sanitary landfill and any fees for same must be included in the Bidder's proposal.
- **15.** Late Bids: Formal bids or amendments thereto received by the County after the time specified for bid opening will not be considered. Bids received after the time specified for bid opening will be returned unopened.
- 16. Mailing of Bids: The County assumes no responsibility for the timely deliverance of mailed bids. Ample time should be allowed for the transmittal of bids by mail, and postmarks indicating the date of mailing will not be considered as evidence of intent to submit bids in proper time for the opening.
- 17. Maryland Buy American Steel Act: In accordance with the Annotated Code of Maryland -State Finance and Procurement Article, Sections 17-301 – 17-306, Washington County is defined as a Public Body and as such shall require a Bidder or subcontractor to use or supply only American Steel products in the performance of a contract as stated in the above referenced Sections.
- **18. Multiple Bids:** No Bidder shall be allowed to offer more than one (1) price on each item even though he/she may feel that there are two (2) or more types or styles that will meet specifications. Bidders must determine for themselves which to offer. If said Bidder should submit more than

one (1) price on any item, all prices for that item may be rejected at the discretion of the Director of Purchasing.

- 19. Officers Not to Benefit: No member of the elected governing body of Washington County, or members of his or her immediate family, including spouse, parents, or children, or any person representing, or purporting to represent any member or members of the elected governing body shall receive or be promised directly or indirectly, any financial benefit, by way of fee, political contribution, or any other similar form of remuneration and/or on the account of awarding and/or executing the contract and that upon request of the County, as a prerequisite to payment pursuant to the terms of this contract, there will be furnished to the requester, under oath, answers to any interrogatories related to a possible conflict of interest as herein embodied. The Bidder, to the best of his/her knowledge, whether he/she be an officer, director, partner or any of its employees directly involved in obtaining contracts with the State, or any County or other subdivision of the State, has not been convicted of bribery or conspiracy to bribe under the laws of any State or Federal Government. Any contract made or entered into where it is discovered that violation of the intent of this provision exists shall be declared null and void and all monies received by the Bidder shall be returned to the County.
- **20. Payment Terms:** Bid prices are to be net thirty (30) calendar days; all discounts are to be deducted and reflected in net prices. Term discounts of less than twenty (20) calendar days will not be considered in connection with any prompt payment discount offered, time will be computed from date of receipt of correct invoice or receipt and acceptance of shipment, whichever is later.
- 21. Procurement Policy Manual: This bid is administered according to Washington County's Procurement Policy Manual adopted by the Board of County Commissioners of Washington County, Maryland on June 25, 2013 and effective July 1, 2013. The contents of the aforementioned Manual may be requested from the Washington County Purchasing Department at 240-313-2330 or may be found on the web site at:

https://www.washco-md.net/wp-content/uploads/2017/07/ProcurementPolicy.pdf.

- 22. **Proposal Forms:** Bids shall be submitted only on the forms provided by the County. The Bidder shall submit one (1) original bid on the forms provided with original signature, sealed to the County for that purpose. All bids must be enclosed in a sealed, opaque envelope marked with the title of the bid and be received in the Washington County Purchasing Department promptly on or before, time, date, and place stipulated on the Invitation to Bid. <u>NO</u> bids received after such stipulated time and date will be considered by the County. *Facsimile Bids will not be accepted*.
- 23. Registration with Maryland Department of Assessments and Taxation: Prior to contracting, private corporations must either be incorporated in the State of Maryland or registered with the Maryland Department of Assessments and Taxation as a foreign corporation and must be in good standing. Proof of such standing is required prior to the start of the contracting process and good standing shall be maintained for the duration of the contract. The website for the State Department of Assessments and Taxation is: <u>http://dat.maryland.gov/Pages/sdatforms.aspx#BNE</u>, email address is <u>sdat.charterhelp@maryland.gov</u>, and phone numbers are: (410) 767-1340 or (888) 246-5941.

- 24. Reservations: The County or its authorized agent reserves the right to reject any or all bids and to waive any informality or deficiency in bids received whenever such rejection or waiver is in the best interest of the County. The County also reserves the right to reject the bid of a Bidder who has previously failed to perform properly or complete on time contracts of a similar nature, or the Bid of a Bidder who investigation shows is not in a position to perform the contract. The County reserves the right to waive minor differences in specifications provided these differences do not violate the specifications intent nor affect the operation for which the items are being purchased, nor increase estimated maintenance and repair cost to the County. The County reserves the right to award contracts or place orders on a lump sum or individual item basis, or such combination as shall, in its judgment, be in the best interest of the County.
- **25. Response to Invitation:** In the event you cannot submit a bid on our requirements, as set forth in the "Invitation to Bid", please return the Bid with an explanation as to why you are unable to bid on these requirements. Because of the large number of firms listed on the County's lists of Bidders, it is necessary to delete from these lists the names of those persons, firms or corporations who fail to respond after having been invited to bid on a commodity or commodities for three (3) successive bid openings.
- 26. Substitutions: All equipment is to be supplied in exact accordance with the specifications. Any Bidder who contemplates offering a product that differs from that specified must obtain the County's written approval prior to bid opening. Substitution requests must be received in the Purchasing Department no later than the date/time specified in the Supplemental Terms and Conditions. Requests received after the specified date/time will not be considered. All such decisions will be considered final and not subject to further recourse.

### 27. Taxes-Responsibility for Payment, Exemptions, Forms to be Filed, etc.:

- a. The County is exempt from State of Maryland Sales Tax. The County's Maryland Sales Tax Exemption Number is 3000129 2. However, the Bidder is responsible for making any necessary inquiries and investigations with regulating state agencies to obtain a determination of tax exemptions in his/her bid.
- b. The Bidder is responsible for and by submitting a Bid agrees to pay all retail sales, income, real estate, sales and use, transportation and special taxes applicable to and assessable against any materials, equipment, processes and operations incident to or involved in the Project. The Bidder is responsible for ascertaining and acquainting his/herself with such taxes and making all necessary arrangements to pay same.
- c. The Successful Bidder shall complete a W-9 Vendor Information form (provided by the County) and return it to the Director of Purchasing.
- d. The County hereby reserves the right to withhold payment under this Contract until the Bidder and any subcontractor performing any duties under this Contract have furnished or caused to be furnished to the Comptroller of the State of Maryland with all properly completed forms required by the said Comptroller and until all of said retail sales and/or

use taxes due the State of Maryland by the Bidder have been paid and the Bidder exhibits a release or receipt from the Comptroller evidencing such payment.

- e. The Bidder is hereby advised of Section 1-106(b)(3) of the Code of Public Local Laws of Washington County, MD: "If a bidder has not paid all taxes owed to the County or a municipal corporation in the County, the County Commissioners may reject the bidder's bid."
- **28.** Withdrawal of Bids: A written request for the withdrawal of a bid or any part thereof may be granted if the request is received by the County prior to the specified time of opening.

### **BID BONDS**

- 1. Bid Deposit Bid Bond, Certified or Cashier's Check: Each bid shall be accompanied by a bid bond signed by a surety company licensed to do business in the State of Maryland, or by a cashier's check, certified check or Treasurer's check drawn on a responsible bank doing business in the United States in the amount of five (5%) percent of the total Bid and shall be made payable to the Board of County Commissioners of Washington County, Maryland. When computing the amount of Bid for Check purposes, DO NOT deduct for trade-ins. U.S. Postal Money Orders are acceptable in lieu of checks.
- 2. Performance/Labor and Material Bonds: The successful Bidder(s) on this bid must furnish the required bonds as indicated at the beginning of the Specifications, made out to the Board of County Commissioners of Washington County, Maryland, prepared on forms contained herein, or in his/her absence, on an approved form, as security for the faithful performance of his/her contract, within fifteen (15) calendar days of his/her notification that his/her bid has been accepted. The surety thereon must be such surety company or companies as are authorized and licensed to transact business in the State of Maryland. Attorneys in fact who sign bonds must file with each bond a certified copy of his/her power of attorney to sign bonds. The successful Bidder or Bidders upon failure or refusal to furnish within fifteen (15) calendar days after his/her notification the required bonds shall forfeit to the County, as liquidated damages his/her bid deposit. The Performance Bond shall be in the amount of one hundred (100%) percent of the contract price covering faithful performance of the contract; and the Labor and Materials Payment Bond shall be in the amount of one contract price as security for payment of all persons performing labor and furnishing materials in connection therewith.

### **SPECIFICATIONS REFERENCES**

1. Formal Specifications: The Bidder shall abide by and comply with the true intent of the specifications and not take advantage of any unintentional error or omission but shall fully complete every part as the true intent and meaning of the specifications and drawings. Whenever mention is made herein, of any article, material, or workmanship to be in accordance with laws, ordinances, building codes, underwriter's codes, A.S.T.M. regulations or similar expressions, the requirements of these laws, ordinances, etc., shall be construed to meet or exceed specification

requirements and current established noise levels for specific equipment, materials, and/or services being furnished under this contract.

- 2. Samples: The Purchasing Department reserves the right to retain or destroy the samples submitted for the purpose of evaluation and will be free from any redress or claim on the part of the Bidder if any samples are lost or destroyed. Bidders shall make all arrangements for delivery of samples to the place designated, as well as the removal of samples. Cost of delivery and removal of samples shall be borne by the Bidder. Upon notification by the Purchasing Department that a sample is available for pickup, it shall be removed within thirty (30) calendar days at the Bidder's expense or the Director of Purchasing shall dispose of same at his/her discretion. All sample packages shall be marked "Sample for Purchasing Department" and each sample shall bear the name of the Bidder, item number, bid number, and shall be carefully tagged or marked in a substantial manner. Failure of the Bidder to clearly identify samples as indicated may be considered sufficient reason for rejection of bid.
- 3. Trade Names/Substitutions: In cases where an item is identified by a manufacturer's name, trade name, catalog number, or reference it is understood that the Bidder proposes to furnish the item so identified and does not propose to furnish an "equal/substitution" unless submission of an "equal/substitution" is stated otherwise as permissible. Any Bidder who contemplates offering a product that differs from that specified must obtain the County's written approval by submission of his/her request no later than the deadline for receipt of substitution requests as stated in the Supplemental Terms and Conditions. The reference to the above catalog is intended to be descriptive but not restrictive and only to indicate to the prospective Bidder articles that will be satisfactory. Bids on makes and catalogs will be considered, provided each Bidder clearly states on the face of his/her proposal exactly what he/she proposes to furnish, and forwards with his/her bid, a cut, illustration, or other descriptive matter which will clearly indicate the character of the article covered by his/her bid. The Director of Purchasing hereby reserves the right to approve as an equal, or to reject as not being an equal, any article the Bidder proposes to furnish which contains major or minor variations from specification requirements but may comply substantially therewith. If no particular brand, model, or make is specified, and if no data are required to be submitted with the bid, and after award and before manufacture or shipment, the successful Bidder may be required to submit working drawings or detailed descriptive data sufficient to enable the Director of Purchasing to judge if each requirement of the specifications is being complied with.

### AWARD

- 1. Award or Rejection of Bids: For contracts of purchase, the contract shall be awarded to the lowest, responsive and responsible Bidder complying with all the provisions of the Invitation, provided the bid price is reasonable and it is to the best interest of the County to accept it. For contracts of sale, the contract shall be awarded to the highest, responsive and responsible Bidder complying with all the provisions of the Invitation, provided the bid price is to the best interest of the County to accept it.
- 2. Notice of Award: A written award (or Acceptance of Bid) mailed (or otherwise furnished) to the successful Bidder within the time for acceptance as specified herein shall be deemed to result in a

binding contract without further action by either party. The bid with respect to all items accepted and all papers accompanying the same, the general conditions and instructions to Bidders, the specifications, and other papers and documents referred to in any of the foregoing shall constitute the formal contract, unless otherwise specified, between the Bidder and the County.

- 3. Political Contribution Disclosure: In accordance with Maryland Code, <u>State Finance and</u> <u>Procurement Article</u>, §17-402, the Bidder shall comply with Maryland Code, <u>Election Law Article</u>, Title 14, which requires that every person that enters into contracts, leases, or other agreements with the State, a county, or any incorporated municipality, or their agencies during a calendar year in which the person receives in the aggregate \$100,000 or more, shall file with the State Administrative Board of Election Laws a statement disclosing contributions in excess of \$500 made during the reporting period to a candidate for elective office in any primary or general election. The statement shall be filed with the State Administrative Board of Election Laws: (1) before a purchase or execution of a lease or contract by the State, a county, an incorporated municipality or their agencies, and shall cover the preceding two (2) calendar years; and (2) if the contribution is made after the execution of a lease or contract, then twice a year, throughout the contract term, on: (a) February 5, to cover the 6-month period ending January 31; and (b) August 5, to cover the 6-month period ending July 31.
- 4. "Requirements" Contract Bid Quantities: On "Requirements" bids, acceptance shall bind the County to pay for, at unit bid prices, only quantities ordered and satisfactorily delivered. All stated quantities are estimated requirements and do not constitute a minimum or maximum.
- 5. **Responsibility/Qualifications of Bidder:** The County may make such investigations as it deems necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the County all such information and data for this purpose as the County may request. The County reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the County that such Bidder is properly qualified to carry out the obligation of the contract and to complete the work contemplated therein. Conditional bids will not be accepted. In determining responsibility, the following qualifications, in addition to price, shall be considered by the Director of Purchasing on contracts of purchase and on contracts of sale (if applicable):
  - a. The ability, capacity and skill of the Bidder to perform the service required.
  - b. The character, integrity, reputation, judgment, experience and efficiency of the Bidder.
  - c. The quality of performance of previous contracts or services.
  - d. The Bidder's previous and present compliance with laws and ordinances relating to the contract or service.
  - e. The sufficiency of the financial resources and ability of the Bidder to perform the contract or provide the service.
  - f. The quality, availability and adaptability of the supplies, or services, to the particular use required.

- g. The ability of the Bidder to provide future maintenance and service for the use of the subject of the contract.
- h. Whether the Bidder is in arrears to the County on a debt or contract or is a defaulter on surety to the County.
- i. Such other information as may be secured having a bearing on the decision to make the award.

In determining a Bidder's responsiveness, the Director of Purchasing shall consider material deviations from the advertised specifications which materially affect price, quantity, quality or limit the Bidder's liability.

- 6. **Specific Bid Quantities:** Where quantities are specifically stated, acceptance will bind the County to order quantities specified and to pay for, at contract prices, all such supplies or services delivered that meet specifications and conditions of the contract. However, the County will not be required to accept delivery of any balances unordered, as of the contract expiration date; unless Bidder furnishes the Director of Purchasing with a statement of unordered balances not later than ten (10) calendar days after the termination date of the contract.
- 7. **Tie Bids:** If two (2) or more Bidders shall be tied for the lowest bid on a purchase contract, quality and service being equal, the contract shall be awarded to a local Bidder. If there is no local Bidder, or more than one local Bidder, the County shall award the contract to one (1) of the Bidders by drawing lots in public.

### **CONTRACT PROVISIONS**

- 1. Availability of Funds: A contract shall be deemed executory only to the extent of appropriations available to each County department/agency for the purchase of such articles. The County's extended obligation on those contracts that envision extended funding through successive fiscal periods shall be contingent upon actual appropriations for the succeeding fiscal year.
- 2. **Contract Alterations:** No alterations or variables in the terms of a contract shall be valid or binding upon the County unless made in writing and signed by the County or its authorized agent.
- 3. **Default:** The contract may be cancelled or annulled by the County in whole or in part by written notice of default to the Bidder upon non-performance or violation of contract terms. An award may be made to the next low Bidder, or, articles specified may be purchased on the open market similar to those so terminated. In either event, the defaulting Bidder (or their surety) shall be liable to the County for costs to the County in excess of the defaulted contract prices: Provided, that the Bidder shall continue the performance of this contract to the extent not terminated under the provisions of this clause. Failure of the Bidder to deliver materials or services within the time stipulated on his/her bid, unless extended in writing by the Director of Purchasing, shall constitute contract default. In the event that a Bidder exempted from posting a Bid or Performance Guarantee

fails to execute and perform any contract awarded to them, they shall forfeit the right to Bid on any future County contract for a period of time determined by the Director of Purchasing and they shall be liable for any costs incurred by the County as a result of his/her default.

- 4. **Guarantee:** All work, supplies, and/or materials and requirements described in the specifications including any modifications thereto which may be made in accordance with the direction and/or approval of the County Director of Purchasing shall be Guaranteed/Warranted for a period of one (1) year from the date of final acceptance by the County as follows, unless indicated otherwise in this contract:
  - a. Against all faulty or imperfect materials and/or equipment and against all imperfect, careless and/or unskilled workmanship.
  - b. Against injury or undue deterioration from proper and usual use of the goods and/or services.
  - c. Removal and replacement with proper materials, equipment, and/or services and reexecute, correct or repair without cost to the County, any materials, equipment, and/or services found to be improper, imperfect, defective or fails to perform as specified.
  - d. Make good all damage caused to other work, materials and/or equipment due to such required removal, replacement and/or re-execution.
  - e. Shall comply with any and all guarantee/warranties of whatever nature referred to in other portions of the contract specifications.

Any warranties whether expressed or implied shall not reduce the risk of the seller's/ manufacturer's obligation to the County against latent defect which may be found during the rated life of the supplies and/or materials and requirements described in the specifications including any approved modifications.

5. **Intergovernmental Purchasing:** The following Agencies/Jurisdictions shall be able to purchase, if applicable, directly from contracts resulting from this Invitation to Bid (ITB): Washington County Board of Education and all of its public schools, Hagerstown Community College, Municipalities of Washington County, and public or quasi-public agencies that receive County money and are exempt from taxation under Section 501(c)(3) of the Internal Revenue Code, i.e., Washington County Volunteer Fire and Rescue Companies. While this ITB is prepared on behalf of the County, it is intended to apply for the benefit of the above-named agencies/jurisdictions as though they were expressly named throughout the document. Each of these agencies/ jurisdictions may purchase from the successful Bidder under the same terms and conditions of the contract with the County, in accordance with each agencies/jurisdiction's respective laws and regulations, or an agency may choose not to procure from the successful Bidder at the agency's sole discretion. If one of the above-named agencies/jurisdictions elects to purchase under the contract, the price shall be determined by using unit costs and other pertinent costs provided in the offer. Any special discounts unique to a particular agency/jurisdiction shall be stated. Bidder shall also submit the attached "Provisions for Other Agencies" form, if included in this bid.

- 6. New Goods, Fresh Stock: All contracts, unless otherwise specifically stated, shall produce new commodities, fresh stock, latest model, design or pack.
- 7. Non-Discrimination: No Bidder who is the recipient of County funds or who proposes to perform any work or furnish any goods under this agreement shall discriminate against any worker, employee or applicant or any member of the public because of religion, race, sex, color or national origin, age, marital status, physical or mental handicap, nor otherwise commit an unfair employment practice. Bidder further agrees that this article will be incorporated by Bidder in all contracts entered into with suppliers of materials or services, Bidders and subcontractors and all labor organizations, furnishing skilled, unskilled and craft union skilled labor, or who may perform any such labor or services in connection with this contract.
- 8. Non-Liability: The Bidder shall not be liable in damages for delay in shipment or failure to deliver when such delay or failure is the result of fire, flood, strike, act of God, act of government, act of an alien enemy or by any other circumstances which, in the Director of Purchasing's opinion, is beyond the control of the Bidder. Under the circumstances, however, the County may in its discretion, cancel the contract.
- **9. Placing of Orders:** Orders against contracts shall be placed with the Bidder on a Purchase Order executed and released by the Director of Purchasing.
- **10. Subletting of Contract:** It is mutually understood and agreed that the Bidder shall not assign, transfer, convey, sublet, or otherwise dispose of their contract or their rights, title or interest therein, or their power to execute such contract, to any other person, firm or corporation, without the previous written consent of the County Director of Purchasing, but in no case shall such consent relieve the Bidder from his/her obligations, or change the terms of the contract.
- **11. Termination of Contracts:** Contracts shall remain in force for full periods specified and until all articles ordered before date of termination shall have been satisfactorily delivered and accepted and thereafter until all requirements and conditions shall have been met, unless:
  - a. Terminated prior to expiration date by satisfactory deliveries of entire contract requirements.
  - b. Extended upon written authorization of the Director of Purchasing and accepted by Bidder, to permit ordering of unordered balances or additional quantities at contract prices and in accordance with contract terms.
- 12. Termination for Convenience: The performance of work under this Contract may be terminated by the County in accordance with this clause in whole, or from time to time in part, whenever the County shall determine that such termination is in the best interest of the County. The County shall pay all reasonable expenses associated with this Contract that the Contractor has incurred up to the date of termination, and all reasonable expenses associated with termination of the Contract; provided, however, the Contractor shall not be reimbursed for any anticipatory profits that have not been earned up to the date of termination.

#### **DELIVERY PROVISIONS**

- 1. **Delivery:** Delivery shall be required to the place designated in the specifications or on the proposal form. All prices must be FOB Destination, Inside Delivery. The weight, count, measure, etc. shall be determined at the points of delivery. The Bidder shall be required to furnish proof of delivery in every instance. Bulk materials are to be placed on skids or pallets. No help for unloading shall be provided by the County. Suppliers shall notify their shippers accordingly.
- 2. Delivery Failures: Failure of a Bidder to deliver within the time specified, or within a reasonable time as interpreted by the Director of Purchasing or failure to make replacements of rejected articles when so requested, immediately or as directed by the Director of Purchasing shall constitute authority for the Director of Purchasing to purchase in the open market articles of comparable grade to replace the articles rejected or not delivered. On all such purchases, the Bidder shall reimburse the County, within a reasonable time specified by the Director of Purchasing, for any expense incurred in excess of contract prices or the County may deduct such amount from monies owed the defaulting Bidder. Such purchases shall be deducted from contract quantities.
- 3. Inspections: Inspection and acceptance of materials or supplies shall be made after delivery. Final inspection shall be conclusive except as regards latent defects, fraud, or such gross mistakes as amount to fraud. Final inspection and acceptance or rejection of the materials or supplies shall be made as promptly as practicable, but failure to inspect and accept or reject materials or supplies shall not impose liability on the County for such materials or supplies as are not in accordance with the specifications. All delivered materials shall be accepted subject to inspection and physical count.
- 4. Hazardous Safety Data Sheets: Any hazardous substances as defined under the Department of Labor Occupational Safety and Health Standard for General Industry (29-CFR-1910.1200) and State of Maryland Law and Regulations on "Access to Information About Hazardous and Toxic Substances", MDSH Article 89, Section 28-49-D, being delivered to Washington County as a result of this Invitation to Bid shall be accompanied by a current "Hazardous Data Safety Sheet" or item may not be accepted.
- 5. Packing Slips or Delivery Tickets: All shipments or deliveries shall be accompanied by Packing Slips or Delivery Tickets and shall contain the following information for each item delivered. Bidders are cautioned that failure to comply with these conditions shall be considered sufficient reason for refusal to accept the goods.

The Purchase Order Number The Name of the Article and Stock Number (Supplier's) The Quantity Ordered The Quantity Back Ordered The Name of the Contractor

- 6. **Responsibility for Materials Shipped:** The Bidder shall be responsible for the materials or supplies covered by this contract until they are delivered at the designated point and the Bidder shall bear all risk on rejected materials or supplies after notice of rejection. Rejected materials or supplies must be removed by and at the expense of the Bidder promptly after notification of rejection, unless public health and safety require immediate destruction or other disposal of rejected delivery. Upon failure of the Bidder to remove materials or supplies within ten (10) calendar days after date of notification, the County may return the rejected materials or supplies to the Bidder at the Bidder's risk and expense or dispose of them as its own property.
- 7. **Testing:** The cost of testing a representative sample of an order or shipment for acceptance shall be borne by the County. However, if the order and shipment is rejected for failure to meet the requirements of the specifications or purchase description, the cost of testing shall be charged to the Bidder.
- 8. **Time of Delivery:** Deliveries shall be accepted between 8:00 A.M. and 3:00 P.M. on weekdays only, unless stated otherwise in the bid document. No deliveries shall be accepted on Saturdays, Sundays or County Holidays, unless otherwise arranged by an individual Department/Agency.

### SUPPLEMENTAL TERMS AND CONDITIONS

- 1. Access to Site: The successful Bidder shall coordinate all efforts of the work and access to the site with the County's authorized representative, Mr. Garrison Plessinger, Director, Hagerstown Regional Airport, 240-313-2764.
- 2. Award: It is anticipated that the County shall award a contract to the responsive, responsible Bidder who submits the lowest Total Sum Bid for the Hagerstown Regional Airport Terminal Building Expansion project.
- **3. Bidders Responsibility:** Each Bidder submitting a proposal for this work shall first examine the site, verify any dimensions pertinent to the work, and thoroughly be satisfied to the conditions under which he/she will operate or that shall in any manner affect any work under this Contract. The Bidder shall accept the site as he/she finds it. All proposals shall take into consideration all conditions that may affect the work. No allowance shall be made to any Bidder for negligence in this respect.
- 4. **Disputes:** In cases of disputes as to whether or not an item or service quoted or delivered meets specifications, the decision of the County Commissioners or authorized representative shall be final and binding on both parties. The County's Director of Purchasing may request in writing, the recommendation of the head of the County agency using the item or materials, or other objective sources.
- 5. Examination of Site: The County will provide a tour of the site, concluding the Pre-Bid Conference, for the purpose of making a visual survey. Before submitting a bid, each Bidder shall visit the site and shall be responsible for knowledge of the conditions affecting the work. The act of submitting a bid is to be considered acknowledgement of the Bidder that he/she has inspected the site and is familiar with the conditions and requirements and shall submit his/her bid accordingly.
- 6. **Exceptions:** The submission of a bid shall be considered an agreement to all the items, conditions, and specifications provided herein and in the various bid documents unless specifically noted otherwise in the proposal.
- 7. Form of Proposal: All bids must be submitted on the forms provided herein.
- 8. **Insurance:** Upon request and prior to execution of the contract, the successful Contractor shall show Evidence of Insurance as outlined in the attached copy of *Insurance Requirements for Independent Contractors*.
- **9.** Interpretations, Discrepancies, and Omissions: Should any Bidder find discrepancies in or omissions for the documents or be in doubt of their meaning, he/she should at once request, in writing, an interpretation from:

Rick Curry, CPPO – Director of Purchasing Washington County Purchasing Department Washington County Administration Complex 100 West Washington Street, Room 3200 Hagerstown, MD 21740 FAX: 240-313-2331; or send questions in Microsoft Word platform via email to: purchasingquestions@washco-md.net

All necessary interpretations will be issued to all Bidders in the form of addenda to the specifications, and such addenda shall become part of the contract documents. Exceptions as taken in no way obligate the County to change the specifications. Failure of any Bidder to receive any such addendum or interpretation shall not relieve such Bidder from any obligation under his/her bid as submitted. The County shall assume no responsibility for oral instructions or suggestions. **ORAL ANSWERS WILL NOT BE BINDING ON THE COUNTY. Requests received after 4:00 P.M. (EDST), Wednesday, May 22, 2019 may not be considered.** 

- **10.** Landfill Fees: Disposal of items shall be at an approved landfill and any fees for same shall be included in the Bidders proposal.
- 11. **Proposal:** This is a lump sum contract. The Total Sum Bid for the work shall include the cost of any and all permits licenses and/or fees, the cost of all applicable seals and other taxes required by Local, State and Federal laws, the cost of required bonds and insurances, the cost of all material, labor, tools, equipment, transportation, landfill user fees, superintending and other services and facilities of every nature whatsoever or as may be necessary to complete the project as described in the specifications.
- 12. Qualification: The County may make such investigations as deemed necessary to determine the ability of the Bidder to perform the work, and the Bidders shall furnish to the County all such information and data for this purpose as the County may request. The County reserves the right to reject any bid if the evidence submitted by or investigation of, such Bidder fails to satisfy the County that such Bidder is properly qualified to carry out the obligation of the Contract and to complete the work contemplated therein. Conditional bids will not be accepted.
- 13. Responsibility of Contractor: Each Bidder submitting a bid for this work shall first examine the site(s) and thoroughly satisfy himself/herself to the conditions under which he/she shall operate or that shall in any manner affect any work under his contract. The Contractor shall accept the site(s) as he/she finds it. All proposals shall take into consideration all conditions that may affect the work. No allowance shall be made to any Contractor for negligence in this respect. Prior to contracting, private corporations must either be incorporated in the State of Maryland or registered with the Maryland Department of Assessments and Taxation as a foreign corporation, and must be in good standing. Proof of such standing is required prior to the start of the contracting process and shall remain so throughout this contract. The website for the State Department of Assessments and Taxation is: http://dat.maryland.gov/Pages/sdatforms.aspx#BNE the phone numbers for the State Department of Assessments and taxation are: (410) 767-1340 or (888) 246-5941.
- 14. **Project Schedule:** The Contractor shall adhere to the project schedule outlined below:

Pre-Bid: Wednesday, May 15, 2019 at 1:30 PM Questions: Wednesday, May 22, 2019 at 4:00 PM Bids: Wednesday, June 5, 2019 at 2:00 PM
## WASHINGTON COUNTY'S INSURANCE REQUIREMENTS FOR INDEPENDENT CONTRACTORS

POLICY TITLE:	Insurance Requirements for Independent Contractors
ADOPTION DATE:	August 29, 1989
EFFECTIVE DATE:	September 1, 1989
FILING INSTRUCTIONS:	

#### I. <u>PURPOSE</u>

To protect Washington County against liability, loss or expense due to damaged property, injury to or death of any person or persons and for care and loss of services arising in any way, out of, or in connection with or resulting from the work or service performed on behalf of Washington County.

#### II. <u>ACTION</u>

The following should be inserted in all Independent Contractor Contracts:

"The Contractor shall procure and maintain at his sole expense and until final acceptance of the work by the County, insurance as hereinafter enumerated in policies written by insurance companies admitted in the State of Maryland, have A.M. Best rating of A- or better or its equivalent, and acceptable to the County."

1. **Workers Compensation:** The Contractor agrees to comply with Workers Compensation laws of the State of Maryland and to maintain a Workers Compensation and Employers Liability Policy.

Minimum Limits Required: Workers Compensation - Statutory Employers' Liability -\$100,000 (Each Accident) \$500,000 (Disease - Policy Limit) \$100,000 (Disease - Each Employee)

2. **Comprehensive General Liability Insurance:** The Contractor shall provide Comprehensive General Liability including Products and Completed Operations.

#### Minimum Limits Required:

Five Million Dollars (\$5,000,000) combined single limit for Bodily Injury and Property Damage.

Such insurance shall protect the County, its agents, elected and appointed officials, commission members and employees, and name Washington County on the policy as additional insured against liability, loss or expense due to damaged property (including loss of use), injury to or death of any person or persons and for care and loss of services arising in any way, out of, or in connection with or resulting from the work of service performed on behalf of Washington County.

The Contractor is ultimately responsible that Subcontractors, if subcontracting is authorized, procure and maintain at their sole expense and until final acceptance of the work by the County, insurance as hereinafter enumerated in policies written by insurance companies admitted in the State of Maryland, have A.M. Best rating of A- or better or its equivalent, and acceptable to the County.

3. **Business Automobile Liability:** The Contractor shall provide Business Auto Liability including coverage for all leased, owned, non-owned and hired vehicles.

#### Minimum Limits Required:

Five Million Dollars (\$5,000,000) combined single limit for Bodily Injury or Property Damage.

**Certificate(s) of Insurance:** The Contractor shall provide certificates of insurance requiring a 30day notice of cancellation to the Insurance Department, Board of County Commissioners of Washington County prior to the start of the applicable project.

Approval of the insurance by the County shall not in any way relieve or decrease the liability of the Contractor. It is expressly understood that the County does not in any way represent that the specified limits of liability or coverage or policy forms are sufficient or adequate to protect the interest or liabilities of the Contractor.

All responsibility for payment of any sums resulting from any deductible provisions, corridor, or self-insured retention conditions of the policy or policies shall remain with the Contractor.

**General Indemnity:** The Contractor shall indemnify, defend and save harmless the Board of County Commissioners of Washington County, its appointed or elected officials, commission members, employees and agents for any and all suits, legal actions, administrative proceedings, claims, demands, damages, liabilities, interest, attorneys fees, costs and expenses of whatsoever kind of nature, whether arising before or after final acceptance and in any manner directly or indirectly caused, occasioned or contributed to in whole or in part by reason of any act, error or omission, fault or negligence whether active or passive by the Contractor, or any one acting under its direction, control or on its behalf in connection with or incident to its performance of the Contract.

Revision Date:	August 27, 1991
Effective Date:	August 27, 1991
Revision Date:	March 4, 1997
Effective Date:	March 4, 1997

#### **PROVISIONS FOR OTHER AGENCIES**

#### BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY, MARYLAND WASHINGTON COUNTY PURCHASING DEPARTMENT

#### **PROVISIONS FOR OTHER AGENCIES**

All items, conditions and pricing shall be made available to the entities listed below if authorized by the Bidder. Authorization is to be indicated by a check mark in the appropriate column. A negative reply will not adversely affect consideration of the bid. Any jurisdiction using this contract shall place its own order with the successful Bidder(s). There is no obligation on the lead jurisdiction for agreements made with other jurisdictions.

<u>YES</u>	<u>NO</u>	JURISDICTION
		WASHINGTON COUNTY PUBLIC SCHOOLS
		WASHINGTON COUNTY HEALTH DEPARTMENT
		OTHER WASHINGTON COUNTY MUNICIPALITIES
		HAGERSTOWN COMMUNITY COLLEGE
		CITY OF HAGERSTOWN
		FREDERICK COUNTY COMMISSIONERS
		OTHER FREDERICK COUNTY MUNICIPALITIES
		ALLEGANY COUNTY COMMISSIONERS
		BOARD OF EDUCATION OF ALLEGANY COUNTY
		OTHER ALLEGANY COUNTY MUNICIPALITIES
		ALLEGANY COMMUNITY COLLEGE
		CITY OF FROSTBURG
		CITY OF CUMBERLAND
		GARRETT COUNTY - GENERAL SERVICES
		BOARD OF EDUCATION OF GARRETT COUNTY
		OTHER GARRETT COUNTY MUNICIPALITIES
		GARRETT COUNTY COMMUNITY COLLEGE
		WASHINGTON COUNTY VOLUNTEER FIRE & RESCUE COMPANIES

**Bidder's Name** 

General Decision Number: MD180050 11/09/2018 MD50

Superseded General Decision Number: MD20170050

State: Maryland

Construction Type: Building

County: Washington County in Maryland.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually.

Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018
1	03/16/2018
2	06/15/2018
3	06/29/2018
4	09/14/2018
5	10/19/2018
6	11/09/2018

ASBE0024-007 10/01/2017

Rates Fringes

#### ASBESTOS WORKER/HEAT & FROST INSULATOR

\$ 35.13 16.22

Includes the application of all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

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TERMINAL BUILDING EXPANSION HAGERSTOWN REGIONAL AIRPOL AIP 3-24-0019-059-2018 (DESIGN); M.	T RT - RICHARD A. HENSON FIELD AA-GR-19-009 (DESIGN)	BII BI	D NO. PUR-1410 D DOCUMENT MARCH 2019
BRMD0001-001 04/29/201	8		
Rates	Fringes		
BRICKLAYER		\$ 31.36	10.78
CARP0340-001 04/01/2010	)		
Washington County east to	Anne Arundel County, Maryland		
Rates	Fringes		
CARPENTER (Acoustical C	Ceiling Installation, Drywall Hanging and For	m Work Onl \$ 24.84 \$ 27.91	y) 10.65 10.90
ELEC0307-010 06/05/2018		+	
Rates	Fringes		
ELECTRICIAN	U	\$ 32.80	17.46
ENGI0037-025 04/01/2017			
Rates	Fringes		
POWER EQUIPMENT OP Backhoe, Excavator, Paver Crane	ERATOR:	\$ 28.93 \$ 30.99	12.85+a 12.85+a
a. PAID HOLIDAYS: New Thanksgiving Day and Chri	Year's Day, Memorial Day, Independence Da stmas Day.	ay, Labor Da	у,
* IRON0568-016 05/01/201	8		
Northern Washington Coun	ty		
Rates	Fringes		
IRONWORKER, STRUCT	URAL AND REINFORCING	\$ 27.06	20.61
* IRON0568-017 05/01/201	8		
Southern Washington Coun	ty		
Rates	Fringes		

TERMINAL BUILDING EXPANSION HAGERSTOWN REGIONAL AIRPORT - RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN)			BID NO. PUR-1410 BID DOCUMENT MARCH 2019	
IRONWORKER,	STRUCTURAL AND REINFORCING	\$ 28.56	20.61	
LABO0616-013 (	)5/01/2015			
Rates	Fringes			
LABORER: Blast LABORER: Mase	ter, Demolition on Tender (Brick, Cement/Concrete)	\$ 19.84 \$ 19.84	16.95 16.95	
PAIN0051-004 0	6/01/2018			
Rates	Fringes			
Glaziers Glazing Contr Glazing Contr	cacts \$2 million and under cacts over \$2 million	\$ 26.07 \$ 30.31	12.15 12.15	
PAIN0051-017 0	6/01/2018			
Rates	Fringes			
PAINTER (Brush	n, Roller, Drywall Finisher/Taper)	\$ 25.06	9.76	
PLAS0039-009 0	7/01/2010			
Rates	Fringes			
CEMENT MASC	N/CONCRETE FINISHER	\$ 25.23	10.95	
PLUM0486-020 (	04/01/2017			
All areas East of I	Hancock, Maryland			
Rates	Fringes			
PIPEFITTER (Ind PLUMBER	cluding HVAC Pipe and System Installation)	\$ 39.20 \$ 39.20	19.19 19.19	
PLUM0489-007	11/01/2017			
All areas west of	Hancock, Maryland			
Rates	Fringes			
PIPEFITTER (Ind	cluding HVAC Pipe and System Installation)	\$ 32.18	14.18	

TERMINAL BUILDING EXPANSION HAGERSTOWN REGIONAL AIRPORT - RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN)		BII BI	D NO. PUR-1410 D DOCUMENT MARCH 2019
PLUMBER	\$ 32.18	14.18	
SFMD0669-001	04/01/2018		
Rates	Fringes		
SPRINKLER FI	TTER (Fire Sprinklers)	\$ 35.60	20.24
SHEE0100-022	11/01/2017		
Rates	Fringes		
SHEET METAL 0-41 miles fr 41-65 miles f 66+ miles fro	WORKER (Including HVAC Duct Installation) om City Hall, Cumberland, Maryland from City Hall, Cumberland, Maryland om City Hall, Cumberland, Maryland	\$ 24.29 \$ 25.29 \$ 26.29	21.07 21.07 21.07
TEAM0453-005	11/01/2017		
Rates	Fringes		
TRUCK DRIVE 10 to 15-yard 9 to 10-yard Over 15-yard Under 5-yard	R: Dump Truck l capacity capacity l capacity l capacity	\$ 22.49 \$ 22.24 \$ 22.84 \$ 21.96	19.61 19.61 19.61 19.61
TRUCK DRIVE Truck	R: Tractor Haul	\$ 22.84	19.61
SUMD2010-084	04/30/2010		
Rates	Fringes		
CARPENTER, A IRONWORKER LABORER: Cor LABORER: Gra LABORER: Lan LABORER: Mas LABORER: Mos LABORER: Pipe OPERATOR: As	All other work , ORNAMENTAL nmon or General de Checker dscape son Tender – Stone rtar Mixer e layer sphalt Roller	\$ 19.66 \$ 23.80 \$ 12.83 \$ 16.00 \$ 10.00 \$ 14.03 \$ 16.61 \$ 15.18 \$ 21.35	$\begin{array}{c} 3.17 \\ 11.63 \\ 1.99 \\ 2.90 \\ 0.00 \\ 0.00 \\ 9.08 \\ 5.58 \\ 5.38 \\ 5.38 \\ 0.56 \end{array}$
OPERATOR: BO OPERATOR: BO OPERATOR: BO OPERATOR: FO	obcat/Skid Steer/Skid Loader oom illdozer orklift	\$ 18.63 \$ 21.44 \$ 18.89 \$ 17.08	8.78 8.29 8.60 2.69

TERMINAL BUILDING EXPANSION HAGERSTOWN REGIONAL AIRPORT - RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN)	BII BI	BID NO. PUR-1410 BID DOCUMENT MARCH 2019	
OPERATOR: Gradall	\$ 20.50	8.74	
OPERATOR: Grader/Blade	\$ 16.75	5.79	
OPERATOR: Loader	\$ 19.32	7.68	
OPERATOR: Roller excluding Asphalt	\$ 18.60	8.10	
PAINTER: Spray	\$ 21.71	6.77	
ROOFER	\$ 20.30	4.70	
SHEET METAL WORKER (Metal Roofs Installation)	\$ 20.71	6.23	
TILE FINISHER	\$ 17.32	0.00	
TILE SETTER	\$ 21.38	0.65	

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four-letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example:

PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The

next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example:

SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. Example:

UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

\*an existing published wage determination

\*a survey underlying a wage determination

\*a Wage and Hour Division letter setting forth a position on a wage determination matter

\*a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations Wage and Hour Division U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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

END OF GENERAL DECISION

## SIGNATURE TO BIDS

#### NOTE: Bidders shall use this page as a cover page when submitting his/her bid.

Each bid must show the full business address and telephone number of the Bidder and be signed by the person legally authorized to sign contracts. All correspondence concerning the bid and contract, including notice of award, copy of contract and purchase order, will be mailed or delivered to the address shown on the bid in the absence of written instructions from the Bidder to the contrary. Bids by partnerships must be signed in the partnership name by one of the members of the partnership or by an authorized representative, followed by the signature and designation of the person signing, who shall also state the names of the individuals composing the partnership. Bids by corporations must be signed with the name of the corporation, followed by the signature and designation of the officer having authority to sign. When requested, satisfactory evidence of authority of the officer signing in behalf of the corporation shall be furnished. Anyone signing the bid as agent shall file satisfactory evidence of his/her authority to do so.

All documents, materials, or data developed as a result of this contract are the County's property. The County has the right to use and reproduce any documents, materials, and data, including confidential information, used in or developed as a result of this contract. The County may use this information for its own purposes or use it for reporting to Federal agencies. The Bidder warrants that it has title to or right of use of all documents, materials, or data used or developed in connection with this contract. The Bidder must keep confidential all documents, materials, and data prepared or developed by the Bidder or supplied by the County. All erasures and/or changes shall be initialed by the individual making modifications to the proposal.

BIDDER MUST SIGN BELOW AND RETURN THESE PAGES AND THE PROPOSAL FORM IN ADDITION TO SUBMITTING ANY DOCUMENTS CALLED FOR BY THE GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS, SPECIFICATIONS, AND ANY OTHER DOCUMENTS HEREIN CONTAINED.

By signing here, Bidder does hereby attest that he/she has read fully the general conditions and instructions, specifications, and any other documents herein contained, and does understand them and will furnish and deliver all labor and materials in accordance with the specifications for the price as listed on the proposal form.

Bidder acknowledges receipt of Addenda by initialing the following:

 Addendum No. 1
 Addendum No. 2
 Addendum No. 3

 Addendum No. 4
 Addendum No. 5
 Addendum No. 6

BIDDER'S COMPANY/FIRM:

ADDRESS:

AUTHORIZED SIGNATURE:

NAME AND TITLE PRINTED:

TELEPHONE & FAX NUMBER:

E-MAIL ADDRESS:

DATE:\_\_\_\_\_

FEDERAL EMPLOYER'S IDENTIFICATION NO.

*For Informational Purposes Only:* Has your company/firm been certified by the State of Maryland as a Minority Business Enterprise? (Please check.)

## PUR-1410

## FORM OF PROPOSAL

#### (Submit Form of Proposal)

**BIDS DUE:** 

Date: Wednesday, June 5, 2019 Time: No later than 2:00 P.M., (EDST)

Project Name: Terminal Building Expansion	l
Washington County Bid No.: PUR-1410	

Proposal	of	(hereinafter
called "Bi *a partner	dder"), *a corporation, organized and existing under the laws of the State of ship, or an individual doing business as	, 
Telephon	e No. ()Fax :)	
Contact:	Name & Title Printed:Address:	
-1- <b>T</b>	E-Mail Address:	

\*Insert corporation, partnership or individual as applicable.

#### Gentlemen/Ladies:

The Bidder, in compliance with your Invitation for Bids for the abovementioned project has examined the plans and specifications with related documents and the size of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials, equipment, plant and services, and to construct the project in accordance with the Contract Documents and Addenda within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part.

#### We hereby submit our proposal for the **Terminal Building Expansion – Hagerstown Regional Airport -Richard A. Henson Field.**

Having carefully examined the Contract Documents for the subject construction project -

Specifications Da	ated Marcl	n 2019				
Drawings Dated	Marcl	n 2019				
Addenda No.	Date	, No.	Date	, No.	Date	
Addenda No.	Date	, No.	Date	, No.	Date	

and having received clarification on all items of conflict or upon which any doubt arose, the undersigned proposes to properly complete the work, in strict accordance with the Contract Documents, for the stipulated sum of, based on the unit prices set forth in the attached Schedule of Prices:

#### FORM OF PROPOSAL

#### 1. <u>TOTAL SUM BID</u>:

To furnish labor, materials, equipment, plant and services necessary to properly complete the work required under the TOTAL LUMP SUM BID, based on the price set forth as shown below in strict accordance with the aforesaid documents, and to be substantially completed within four hundred and fifty-six (456) consecutive calendar days of Notice to Proceed.

#### **Base Bid:**

	_ Dollars \$	
(Written)		(Figures)
Add Alternate No. 1 – Passenger Boarding Bridge and		_
Interior Ramp:		
	_ Dollars \$	
(Written)		(Figures)
Add Alternate No. 2 – Main Terminal Flooring		
Replacement:		
	_ Dollars \$	
(Written)		(Figures)
Add Alternate No. 3 - Airline/Concession/Rental Car		
Counters:		
	_ Dollars \$	
(Written)		(Figures)
Add Alternate No. 4 - Main Terminal Paint and Wall		
Finishes		
	_ Dollars \$	
(Written)		(Figures)
Add Alternate No. 5 – Exterior Canopies		
	_ Dollars \$	
(Written)		(Figures)
Add Alternate No. 6 – New Generator		
	_ Dollars \$	
(Written)		(Figures)

(Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.)

Washington County will award this Project based on the total Base Bid only or Base Bid and any combination of Add Alternates included in the Contract Documents, whichever is in the best interest of the County.

It is understood that the bid price will be firm for a time period of one hundred and twenty (120) calendar days from the bid opening date and that if the undersigned is notified of acceptance of this proposal within this time period, the firm shall complete the total work within four hundred and fifty six (456) consecutive calendar days from the date of "Notice to Proceed" for construction and to complete the work in accordance with the provisions of the Contract Documents. If this work is not completed within the time period specified, the Contractor will be liable for liquidated damages of two thousand (\$2,000.00) dollars per consecutive calendar day will be applied.

#### 2. <u>SUBCONTRACTORS</u>:

- A. All Bidders shall submit their list of subcontractors list as part of their bid packet.
- B. No change or deviation from this list shall be allowed except as determined by the Owner or the Owner's Representative.
- 3. <u>AWARD</u>: Award of the bid can be made by the Owner to the responsive, responsible low bidder based on the Total Sum Bid.

#### 4. BIDDER'S STATE OF MARYLAND REGISTRATION NUMBER:

Construction Firm License No.	Date Issued	Place of Issuance

Federal Employer Identification Number (FEIN) or Social Security No. if no FEIN

Bid Security Bonds shall be submitted with each proposal in the amount of five percent (5%) of the Total Sum Bid.

Bid Bonds, except those of the two (2) low bidders will be returned after the bid opening. Other bid bonds will be returned after the related contract has been executed. If no bid has been accepted within one hundred and twenty (120) calendar days after the bid opening, then any bond may be returned upon demand of the bidder.

Upon receipt of written notice of the acceptance of this bid, bidder will execute the formal contract within fifteen (15) calendar days. The Bid Security attached, in the sum of:

 Dollars \$

 (Written)

(Figures)

Is to become the property of the Owner in the event the Contract and Bond are not executed within the time set forth above, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Failure to properly and completely fill in all blanks may be cause for rejection of this proposal. All alternates and unit prices called for in the Contract Documents must be submitted herewith.

BIDDER'S NAME

BIDDER'S SEAL

BY: \_\_\_\_\_

CITY

SIGNATURE AND TITLE

ZIP

ADDRESS

**STATE** 

INSTRUCTIONS:

The bidder shall provide a Schedule of Values from in accordance with the Specification Section 00 43 73 Proposed Schedule of Values Form.

#### FORM OF PROPOSAL

#### **BID BOND**

#### KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned

\_\_\_\_\_\_as Principal, and \_\_\_\_\_as Surety, are hereby held and firmly bound unto the Board of County Commissioners of Washington County, Maryland as OWNER in the penal sum of \_\_\_\_\_\_(five percent (5%) of Total Bid) for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this \_\_\_\_\_\_\_ day of \_\_\_\_\_\_, 2019. The Condition of the above obligation is such that whereas the Principal has submitted to the Board of County Commissioners of Washington County, Maryland a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for Contract No. PUR-1410 Terminal Building Expansion, Hagerstown Regional Airport - Richard A. Henson Field.

#### NOW, THEREFORE,

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attachment hereto (Properly completed in accordance with said BID) and shall furnish a BOND for **faithful** performance of said contract, and for the payment of all persons performing labor furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

		(L.S.)
	Principal	. ,
	Surety	
Dru	2	

**IMPORTANT** - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and authorized to transact business in the State where the project is located.

## AFFIDAVIT OF NON-COLLUSION AND BRIBERY CONVICTIONS

#### **AFFIRMATION REGARDING COLLUSION**

#### I AFFIRM THAT:

Neither I nor, to the best of my knowledge, information, and belief, the below stated business has:

- (a) Agreed, conspired, connived, or colluded to produce a deceptive show of competition in the compilation of the accompanying bid or offer that is being submitted;
- (b) In any manner, directly or indirectly, entered into any agreement of any kind to fix the bid price or price proposal of the Bidder or Offeror or of any competitor, or otherwise taken any action in restraint of free competitive bidding in connection with the contract for which the accompanying bid or offer is submitted.

#### AFFIRMATION REGARDING BRIBERY CONVICTIONS

#### I FURTHER AFFIRM:

Neither I nor, to the best of my knowledge, information, and belief, the below business (as is defined in Section 16-101 (b) of the State Finance and Procurement Article of the Annotated Code of Maryland), or any of its officers, directors, partners, or any of its employees directly involved in obtaining or performing contracts with public bodies (as is defined in Section 16-101(f) of the State Finance and Procurement Article of the Annotated Code of Maryland), has been convicted of, or has had probation before judgment imposed pursuant to Criminal Procedure Article, Section 6-220 of the Annotated Code of Maryland, or has pleaded nolo contendere to a charge of, bribery, attempted bribery, or conspiracy to bribe in violation of Maryland law, or of the law of any other State or federal law, **except as follows** (indicate the reasons why the affirmation cannot be given and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of person(s) involved, and their current positions and responsibilities with the business):

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THE ABOVE-REFERENCED AFFIDAVIT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF AND THAT I AM THE DULY AUTHORIZED REPRESENTATIVE OF THE BELOW BUSINESS AND THAT I POSSESS THE LEGAL AUTHORITY TO MAKE THE AFFIDAVITS AND CERTIFICATION ON BEHALF OF MYSELF AND THE BUSINESS FOR WHICH I AM ACTING.

BY:

<sup>(</sup>Signature of Authorized Representative and Affiant)

(Name & Title Printed)		
(Business Address)		

(Federal Employer Identification Number)

(SEAL) If bid is by corporation.

## BIDDER'S EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION (EEOC)

Section 151.54(d)(1) of the FAA Regulations requires each bidder or prospective Contractor or any of their proposed subcontractors, to state as an initial part of the bid whether it has participated in any previous contract or subcontract subject to the equal employment opportunity clause; and, if so, whether it has filed with the Committee or agency all compliance reports due under applicable instructions. In any case in which a bidder or prospective Contractor or proposed Contractor which has participated in a previous contract or subcontract subject to the equal employment opportunity clause has not filed a compliance report due under applicable instructions, such bidder, prospective Contractor, or proposed subcontractor shall be required to submit a compliance report prior to the award of the proposed contract or subcontract [41 CFR 60- 1.6(b)(1)].

The bidder shall complete the following statement by checking the appropriate spaces. Failure to complete will result in a non-responsive bid.

The bidder has, has not, participated in a previous contract subject to the discrimination clause prescribed by Executive Order 10925 dated March 6, 1961, or Executive Order 11114 dated June 22, 1963, or Executive Order 11246 dated September 24, 1965.

The bidder has, has not, submitted compliance reports as required by applicable instructions, the successful bidder will be required to submit a Standard Form 100 (for Federally-Assisted Construction Contracts) before award.

Certification: The information above is true and complete to the best of my knowledge and belief.

Name and Title of Signer

Signature

Date

#### **CERTIFICATION OF NON-SEGREGATED FACILITIES**

The federally-assisted construction contractor certifies that it does not maintain or provide, for its employees, any segregated facilities at any of its establishments and that it does not permit employees to perform services where segregated facilities are maintained. The federally assisted construction contractor certifies further that it will not maintain or provide, for its employees, segregated facilities at any of its establishments, and that it will not permit its employees to perform services at any location, under its control, where segregated facilities are maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the equal opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating area, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities pro-vided for employees which are segregated by explicit directives or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The federally assisted construction contractor agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the equal opportunity clause and that he will retain such certifications in his files.

# NOTICE TO PROSPECTIVE CONTRACTORS OF REQUIREMENT FOR CERTIFICATION FOR NONSEGREGATED FACILITIES:

A Certification of Non-Segregated Facilities must be submitted prior to the award of a contract or subcontract exceeding \$10,000 which is not exempt from the provisions of the equal opportunity clause.

Certification - The information above is true and complete to the best of my knowledge and belief.

Name and Title of Signer (Please Type)

Signature

Date

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001. BIDDERS NAME:

ADDRESS:

INTERNAL REVENUE SERVICE EMPLOYER IDENTIFICATION NUMBER

#### HAGERSTOWN REGIONAL AIRPORT – RICHARD A. HENSON FIELD

#### DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM

In accordance with Federal Regulations (49 CFR Part 23) and Department of Transportation guidelines, it is the policy of The Board of County Commissioners of Washington County, Maryland and Hagerstown Regional Airport – Richard A. Henson Field to utilize Disadvantaged Business Enterprises (DBE) in all aspects of contracting.

The percentage of dollar awards on each Airport Improvement Program or Planning Grant Program project has been established at nine and seventy-two hundredths percent (9.72%).

It is the position of the Board of County Commissioners of Washington County, Maryland and Hagerstown Regional Airport – Richard A. Henson Field that DBE's be afforded the opportunity to actively participate in the economic mainstream of architectural, engineering, construction, and other service activities involving the use of Federal funds. The participation goal is a percentage of the dollar amount of each grant based on a project to project basis.

Selection will be based on the determination of whether or not the competitor offering the lowest responsible price has also met the established DBE goals, unless said bidder submits, in writing, an acceptable explanation as to why the DBE involvement is at a lower percentage or absent entirely from the project bid. This written explanation must show that the Contractor has made every effort to identify and solicit DBE involvement.

#### **BIDDER'S DBE CERTIFICATION**

To meet the requirements of Department of Transportation, Regulation 49 CFR Part 23, all bidders will provide evidence of the methods they have used to meet the Disadvantaged Business Enterprise goal as published in the Sponsor's Disadvantaged Business Enterprise Plan and approved by the Department of Transportation. The DBE participation goal for this project is nine and seventy-two hundredths percent (9.72%).

All bidders must submit an assurance stating the percentage of Disadvantaged Businesses they intend to employ on this project.

WITHIN 5 DAYS AFTER THE OPENING OF BIDS AND BEFORE THE AWARD OF A CONTRACT, ALL BIDDERS OR PROPOSERS WISHING TO REMAIN IN COMPETITION FOR THE CONTRACT SHALL SUBMIT:

- 1. Names of the DBE subcontractors they intend to use.
- 2. Description of work each DBE subcontractor is to perform.
- 3. The dollar amount of the participation of each DBE firm.
- 4. Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) provided with the Bid Proposal to meet the Owner's project goal; and
- If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26.

## REQUIRED ASSURANCE TO BE INCLUDED IN ALL BID PROPOSALS.

This firm assures that it will utilize not less than\_% of Disadvantaged Business participation.

CERTIFICATION OF BIDDER FOR THE ABOVE:

AUTHORIZED REPRESENTATIVE
---------------------------

DATE

NAME

TITLE

COMPANY

(SEAL)

#### SUBCONTRACTORS AND SUPPLIERS

Low bidder shall provide the Subcontractor and supplier list to the Owner within 48 hours of the bid opening. If a subcontractor or supplier is a Disadvantaged Business Enterprise (DBE), please indicate it on this list.

	Name of the Subcontractor/Supplier		
No.	and Description of Work to be Performed	Contact Name/Tel. No.	Approximate Value
	T errormed		

## **BUY AMERICAN CERTIFICATE**

By submitting a bid under this solicitation, except for those items listed by the offeror below or on a separate and clearly identified attachment to this bid the offeror certifies that steel and each manufactured product, are produced in the United States, as defined in the clause Buy American – Steel and Manufactured Products for Construction Contracts and that components of unknown origin are considered to have been produced or manufactured outside the United States.

Offerors may obtain from the owner a listing of articles, materials, and supplies excepted from this provision.

Product	Country of Origin

## BID NO. PUR-1410 TERMINAL BUILDING EXPANSION FOR HAGERSTOWN REGIONAL AIRPORT RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESGIN); MAA-GR-19-009 (DESIGN)

## Certificate of Buy American Compliance for Total Facility

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with its proposal. The bidder or offeror must indicate how it intends to comply with 49 USC § 50101 by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e. not both) by inserting a checkmark ( $\checkmark$ ) or the letter "X".

□ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101 by:

- a) Only installing steel and manufactured products produced in the United States; or
- b) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
- c) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

- To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
- To faithfully comply with providing U.S. domestic products.
- To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- □ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:
  - a) To the submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that supports the type of waiver being requested.
  - b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
- c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
- d) To furnish U.S. domestic product for any waiver request that the FAA rejects.
- e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

#### **Required Documentation**

**Type 3 Waiver** – The cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the "facility". The required documentation for a Type 3 waiver is:

- a) Listing of all manufactured products that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
- b) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
- c) Percentage of non-domestic component and subcomponent cost as compared to total "facility" component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

**Type 4 Waiver** – Total cost of project using U.S. domestic source product exceeds the total project cost using non-domestic product by 25 percent. The required documentation for a Type 4 of waiver is:

- a) Detailed cost information for total project using U.S. domestic product
- b) Detailed cost information for total project using non-domestic product

**False Statements**: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date

Signature

Company Name

Title

#### BID NO. PUR-1410 TERMINAL BUILDING EXPANSION FOR HAGERSTOWN REGIONAL AIRPORT RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN)

#### **Certificate of Buy American Compliance for Manufactured Products**

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101 by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (not both) by inserting a checkmark ( $\checkmark$ ) or the letter "X".

□ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101 by:

- a) Only installing steel and manufactured products produced in the United States;
- Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
- c) Installing products listed as an Excepted Article, Material, or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

- 1. To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
- 2. To faithfully comply with providing U.S. domestic product.
- 3. To furnish U.S. domestic product for any waiver request that the FAA rejects.
- 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- □ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:
  - 1. To submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that supports the type of waiver being requested.
  - 2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination may result in rejection of the proposal.

- 3. To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
- 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

#### **Required Documentation**

**Type 3 Waiver** – The cost of the item components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the "item". The required documentation for a Type 3 waiver is:

- a) Listing of all product components and subcomponents that are not comprised of 100 percent U.S. domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
- b) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
- c) Percentage of non-domestic component and subcomponent cost as compared to total "item" component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

**Type 4 Waiver** – Total cost of project using U.S. domestic source product exceeds the total project cost using non-domestic product by 25 percent. The required documentation for a Type 4 of waiver is:

- a) Detailed cost information for total project using U.S. domestic product
- b) Detailed cost information for total project using non-domestic product

**False Statements**: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date

Signature

Company Name

Title

#### BID NO. PUR-1410 TERMINAL BUILDING EXPANSION HAGERSTOWN REGIONAL AIRPORT - RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN)

#### <u>CERTIFICATION OF OFFERER/BIDDER REGARDING TAX DELINOUENCY AND</u> <u>FELONY CONVICTIONS</u>

The applicant must complete the following two certification statements. The applicant must indicate its current status as it relates to tax delinquency and felony conviction by inserting a checkmark ( $\checkmark$ ) in the space following the applicable response. The applicant agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification in all lower tier subcontracts.

#### Certifications

- 1) The applicant represents that it is () is not () a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.
- 2) The applicant represents that it is () is not () a corporation that was convicted of a criminal violation under any Federal law within the preceding twenty-four (24) months.

#### Note

If an applicant responds in the affirmative to either of the above representations, the applicant is ineligible to receive an award unless the sponsor has received notification from the agency suspension and debarment official (SDO) that the SDO has considered suspension or debarment and determined that further action is not required to protect the Government's interests. The applicant therefore must provide information to the owner about its tax liability or conviction to the Owner, who will then notify the FAA Airports District Office, which will then notify the agency's SDO to facilitate completion of the required considerations before award decisions are made.

#### **Term Definitions**

**Felony conviction:** Felony conviction means a conviction within the preceding twentyfour (24) months of a felony criminal violation under any Federal law and includes conviction of an offense defined in a section of the U.S. code that specifically classifies the offense as a felony and conviction of an offense that is classified as a felony under 18 U.S.C. § 3559. **Tax Delinquency:** A tax delinquency is any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

#### **CERTIFICATION REGARDING LOBBYING**

#### I CERTIFY:

By signing and submitting this bid or proposal, to the best of my knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

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

Date	Signature
Company Name	Title

# **SECTION 2 FORM OF CONTRACT**

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#### PUR-1410 TERMINAL BUILDING EXPANSION HAGERSTOWN REGIONAL AIRPORT - RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN)

#### CONTRACT AGREEMENT BY AND BETWEEN THE

#### BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY, MARYLAND

#### AND

THIS CONTRACT AGREEMENT (hereinafter the "Contract"), is made this \_\_\_\_\_\_ day of \_\_\_\_\_\_, 2019, by and between (hereinafter the "Contractor") and the **BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY, MARYLAND**, a body corporate and politic and a political subdivision of the State of Maryland, (hereinafter the "County").

#### **RECITALS**

This Contract for the construction of **Contract No. PUR-1410**, Terminal Building Expansion at Hagerstown Regional Airport - Richard A. Henson Field, near Hagerstown, Washington County, Maryland, as shown on the drawings identified in the same manner, with a final approval date of March, 2019, on file at the Hagerstown Regional Airport, Maryland, subject to all the conditions, covenants, stipulations, terms and provisions contained in the Specifications, the Specifications being in all respects incorporated herein by reference and made a part hereof as if attached or entirely stated herein, has recently been awarded to the Contractor by the County, at and for a sum equal to the prices and rates respectively named therefore in the bid.

One of the conditions of said award is that a formal contract be executed by and between the Contractor and the County evidencing the terms of said award.

NOW, THEREFORE, in consideration of the mutual covenants, conditions and agreements herein contained, the parties hereby agree as follows:

1. The "Contract Documents," except for modifications issued after the execution of this Contract, are enumerated as follows and are incorporated herein by reference and made a part hereof as if attached or entirely stated herein:

Invitation to Bid General Conditions and Instructions to Bidders Supplemental Terms and Conditions The Insurance Requirements for Independent Contractors Provisions for Other Agencies Wage Rates Signature to Bids Form of Proposal

#### CONTRACT AGREEMENT

Bid Bond Affidavit of Non-Collusion and Bribery Convictions **Bidders** EEOC Certification of Non-Segregated Facilities **DBE** Program DBE Certification Subcontractors and Suppliers Buy American Certificate Certificate of Buy American Compliance for Total Facility Certificate of Buy American Compliance for Manufactured Products Certification of Offeror/Bidder Regarding Tax Delinquency and Felony Convictions and Lobbying The executed Contract Agreement between the County and the Contractor Labor and Material Payment Bond Performance Bond FAA General Provisions Federal Requirements for AIP Program Contracts Technical Specifications Procurement and Contracting Requirements General Requirements Existing Conditions Concrete Masonry Metal Wood, Plastic, and Composites Thermal and Moisture Protection **Openings** Finishes **Specialties** Equipment *Furnishings* Plumbing *Heating, Ventilating, and Air Conditioning (HVAC)* Electrical *Communications* Electronic safety and Security Earthwork Exterior Improvements **Utilities Transportation** 

Contract Drawings dated <u>March 2019</u>

- 2. The date of commencement and substantial completion of the project contemplated herein shall be as set forth in the Instructions to Bidders and stipulated by the Notice to Proceed or an authorized extension thereof.
- 3. The Contractor shall complete **Contract No. PUR-1410**, Terminal Building Expansion at Hagerstown Regional Airport Richard A. Henson Field , near Hagerstown, Washington County, Maryland, in accordance with each and every one of the conditions, covenants, stipulations, terms and provisions contained in the aforementioned Specifications, which in all respects are incorporated herein by reference and made a part hereof as if attached or entirely stated herein, and as shown on the aforementioned drawings, which are also incorporated herein by reference and made a part hereof as if attached or entirely stated herein by reference and rates respectively named therefore in the bid attached hereto, and shall comply with and perform each and every obligation imposed upon it by the said Specifications or by the terms of said award.
- 4. The County shall comply with and perform each and every obligation imposed upon it by the said Specifications or by the terms of the said award.
- 5. The County shall pay the Contractor for the Contractor's performance of the Contract the sum of \_\_\_\_\_\_\_\_ *Dollars and* \_\_\_\_\_\_\_ *Cents* (\$\_\_\_\_\_\_\_) (hereinafter the "Contract Sum"), when due and payable under the terms of the said Specifications and the terms of said award and shall be subject to additions and deductions as provided for in the Contract Documents.
- 6. Payments shall be made on account of the Contract Sum to the Contractor as set forth in the Contract Documents.
- 7. The Contractor hereby certifies that it is a corporation authorized and registered to do business in the State of Maryland with the Maryland State Department of Assessments and Taxation.
- 8. The Contractor hereby certifies that it has read and understood the provisions of the Washington County Purchasing guidelines dealing with conflicts of interest, and that it further certifies, represents and warrants to the County that there is no current conflict of interest and that the Contractor shall refrain from any such conflict of interest for the duration of this Contract.
- 9. This Contract was made and entered into in the State of Maryland and shall be governed and construed in accordance with the laws of the State of Maryland. As to the Contractor, this Contract is intended to be a contract under seal and specialty.
- 10. The Recitals are incorporated into this Contract as substantive provisions.

IN WITNESS WHEREOF, the parties have caused this Contract to be duly executed and delivered, the day and year first above written.

#### **APPROVED AND AGREED TO:**

ATTEST:	
	BY:
	(Signature)
	<b>APPROVED AND AGREED TO:</b>
ATTEST:	BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY, MARYLAND
	(SEAL)
Krista Hart, Clerk	Jeffery A. Cline, President

**Recommended for approval:** 

Garrison Plessinger, Director Hagerstown Regional Airport

**Approved for Legal Sufficiency:** 

Kirk C. Downey County Attorney

**END OF DOCUMENT** 

#### LABOR AND MATERIAL PAYMENT BOND

Board of County Commissioners of Washington County, Maryland

BOND NO.\_\_\_\_\_

CONTRACT NO. PUR-1410

Date Bond Executed: , 2019

KNOW ALL MEN BY THESE PRESENTS, that we\_\_\_\_\_

(Here insert full name and address or legal title of Contractor, including zip code)

a corporation organized and existing under the laws of the State of Maryland and authorized to do business in the State of Maryland, hereinafter called the "Principal" and

(Here insert full name and address or legal title of Surety, including zip code)

a corporation organized and existing under the laws of the State of \_\_\_\_\_, and authorized to do business in the State of Maryland, hereinafter called the "Surety", are held and firmly bound unto the Board of County Commissioners of Washington County, Maryland, a body corporate and politic, and a political subdivision of the State of Maryland, hereinafter called the "County", for the use and benefit of claimants as hereinafter defined, in the Penal Sum

*Dollars and Cents* (\$\_\_\_\_\_) lawful money, for the payment of which Penal Sum we bind ourselves, our heirs, executors, administrators, personal representatives, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into or will enter into a contract with the County, for the Terminal Building Expansion - Hagerstown Regional Airport - Richard A. Henson Field (Contract No. PUR-1410), in Washington County, Maryland. The contract and all items incorporated into the contract, together with any and all changes, extensions of time, alterations, modifications, or additions to the contract or to the work to be performed there under or to the Plans, Specifications, and Special Provisions, or any of them, or to any other items incorporated into the contract shall hereinafter be referred to as the "Contract".

WHEREAS, it is one of the conditions precedent to the final award of the Contract that these presents be executed.

NOW, THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and materials furnished, supplied and reasonably required for use in the performance of the Contract, then this obligation shall be null and void, otherwise it shall remain in full force and effect, subject to the following conditions:

1. A **Claimant** is defined to be any and all of those persons supplying labor and materials (including lessors of the equipment to the extent of the fair market value thereof) to the Principal or its subcontractors and sub-subcontractors in the prosecution of the work provided for the Contract, entitled to the protection provided by Md. Code Ann., State Finance and Procurement Article, §17-101, *et seq.*, as from time to time amended.

2. The above-named Principal and Surety hereby jointly and severally agree with the County that every claimant as herein defined, who has not been paid in full may, pursuant to and when in compliance with the provisions of the aforesaid State Finance and Procurement Article, §17-101, *et seq.*, sue on this Bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant and have execution thereon. The County shall not be liable for the payment of any costs or expenses of any such suit.

The Surety hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed thereunder of the Specifications accompanying the same shall in any way affect its obligations on this Payment Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or the Specifications.

This Payment Bond shall be governed and construed in accordance with the laws of the State of Maryland and any reference herein to the Principal or Surety in the singular shall include all entities in the plural who or which are signatories under the Principal or Surety heading below.

IN WITNESS WHEREOF, the Principal and Surety have set their hands and seals to this Payment Bond this \_\_\_\_\_\_\_ day of \_\_\_\_\_\_, 2019.

WITNESS:

		(Typed Name of Principal)
	BY:	(SEAL)
		(Typed Name and Title)
WITNESS:		
		(Typed Name of Surety)
	BY:	(SEAL)
		(Typed Name and Title)
		(Name of Local Agent)
	()_	(Telephone Number of Local Agent)

#### PERFORMANCE BOND

Board of County Commissioners of Washington County, Maryland

BOND NO.\_\_\_\_\_

#### CONTRACT NO. <u>PUR-1410</u>

Date Bond Executed:\_\_\_\_\_, 2019

KNOW ALL MEN BY THESE PRESENTS, that we

(Here insert full name and address or legal title of Contractor, including zip code)

a corporation organized and existing under the laws of the State of \_\_\_\_\_\_ and authorized to do business in the State of Maryland, hereinafter called the "Principal" and

(Here insert full name and address or legal title of Surety, including zip code)

well and truly to be made, the Principal and the Surety bind themselves, their heirs, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into or will enter into a contract with the County for the Terminal Building Expansion – Hagerstown Regional Airport - Richard A. Henson Field (*Contract No. PUR-1410, hereinafter the "Contract"), in Washington County, Maryland,* which Contract and all work to be done thereunder and all the plans, drawings, and specifications accompanying the same shall be deemed a part hereof and shall be incorporated by reference herein to the same extent as if fully set forth.

NOW, THEREFORE, during the original term of said Contract, during any extensions thereto that may be granted by the County, and during the guarantee and warranty period, if any, required under the Contract, unless otherwise stated therein, this Performance Bond shall remain in full force and effect unless and until the following terms and conditions are met:

- 1. Principal shall well and truly perform the Contract; and
- 2. Principal and Surety shall comply with the terms and conditions in this Performance Bond.

Whenever Principal shall be declared by the County to be in default under the Contract, the Surety may, within ten (10) days after notice of default from the County, notify the County of its election to either promptly proceed to remedy the default or promptly proceed to complete the Contract in accordance with and subject to its terms and conditions. In the event the Surety does not elect to exercise either of the above stated options, then the County thereupon shall have the remaining contract work completed, Surety to remain liable hereunder for all expenses of completion up to but not exceeding the penal sum stated above.

The Surety for value received hereby stipulates and agrees that no change, extension of time,

alteration, or addition to the terms of the Contract or to the work to be performed thereunder of the Specifications accompanying the same shall in any way affect its obligations on this Performance Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder of the specifications accompanying the same.

This Performance Bond shall be governed by and construed in accordance with the laws of the State of Maryland and any reference herein to Principal or Surety in the singular shall include all entities in the plural who or which are signatories under the Principal or Surety heading below.

IN WITNESS WHEREOF, Principal and Surety have set their hands and seals to this Performance Bond. If any individual is a signatory under the Principal heading below, then each such individual has signed below on his or her own behalf, has set forth below the name of the firm, if any, in whose name he or she is doing business, and has set forth below his or her title as a sole proprietor. If any partnership or joint venture is a signatory under the Principal heading below, then all members of each such partnership or joint venture, and each member has set forth below his or her title as a general partner, limited partner, or member of joint venture, whichever is applicable. If any corporation is a signatory under the Principal or Surety heading below, then each such corporation has caused the following: the corporation's name to be set forth below, a duly authorized representative of the corporation to affix below the corporation's seal and to attach hereto a notarized corporate resolution or power of attorney authorizing such action, and each such duly authorized representative to sign below and to set forth below his or her title as a representative of the corporation. If any individual acts as a witness to any signature below, then each such individual has signed below and has set forth below his or her title as a witness. All of the above has been done as of the Date of Bond shown above.

Signed, and sealed this	day of	, 2019.
WITNESS:		
		(Typed Name of Principal)
		BY:(SEAL)
		(Typed Name and Title)
WITNESS:		(Typed Name of Surety)
		BY:(SEAL)
		(Typed Name and Title)
		(Name of Local Agent)
		()(Telephone Number of Local Agent)

# **SECTION 3 FAA GENERAL PROVISIONS**

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#### Section 10 Definition of Terms

When the following terms are used in these specifications, in the contract, or in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be defined as follows:

Paragraph Number	Term	Definition
10-01	AASHTO	The American Association of State Highway and Transportation Officials.
10-02	Access Road	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
10-03	Advertisement	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
10-04	Airport	Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.
10-05	Airport Improvement Program (AIP)	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
10-06	Air Operations Area (AOA)	The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.
10-07	Apron	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.
10-08	ASTM International (ASTM)	Formerly known as the American Society for Testing and Materials (ASTM).
10-09	Award	The Owner's notice to the successful bidder of the acceptance of the submitted bid.
10-10	Bidder	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
10-11	Building Area	An area on the airport to be used, considered, or

Paragraph Number	Term	Definition
		intended to be used for airport buildings or other airport
		facilities or rights-of-way together with all airport
		buildings and facilities located thereon.
10-12	Calendar Day	Every day shown on the calendar.
10-13	Certificate of Analysis	The COA is the manufacturer's Certificate of
	(COA)	Compliance (COC) including all applicable test results
		required by the specifications.
10-14	Certificate of	The manufacturer's certification stating that materials
	Compliance (COC)	or assemblies furnished fully comply with the
		requirements of the contract. The certificate shall be
		signed by the manufacturer's authorized representative.
10-15	Change Order	A written order to the Contractor covering changes in
		the plans, specifications, or proposal quantities and
		establishing the basis of payment and contract time
		adjustment, if any, for work within the scope of the
10.16	0	contract and necessary to complete the project.
10-16	Contract	A written agreement between the Owner and the
		Contractor that establishes the obligations of the parties
		furnishing of labor, againment and materials and the
		has a f navment
		The awarded contract includes but may not be limited
		to: Advertisement Contract form Proposal
		Performance bond navment bond General provisions
		certifications and representations. Technical
		Specifications, Plans, Supplemental Provisions,
		standards incorporated by reference and issued addenda.
10-17	Contract Item (Pay	A specific unit of work for which a price is provided in
	Item)	the contract.
10-18	Contract Time	The number of calendar days or working days, stated in
		the proposal, allowed for completion of the contract,
		including authorized time extensions. If a calendar date
		of completion is stated in the proposal, in lieu of a
		number of calendar or working days, the contract shall
	~	be completed by that date.
10-19	Contractor	The individual, partnership, firm, or corporation
		primarily liable for the acceptable performance of the
		work contracted and for the payment of all legal debts
		pertaining to the work who acts directly or through
		awith agents or employees to complete the contract
10-20	Contractors Quality	The Contractor's OC facilities in accordance with the
10-20	Contractors Quanty	The contractor 5 20 rating in accordance with the

Paragraph Number	Term	Definition
	Control (QC) Facilities	Contractor Quality Control Program (CQCP).
10-21	Contractor Quality Control Program (CQCP)	Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.
10-22	Control Strip	A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.
10-23	Construction Safety and Phasing Plan (CSPP)	The overall plan for safety and phasing of a construction project developed by the airport operator or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
10-24	Drainage System	The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
10-25	Engineer	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering, inspection, and/or observation of the contract work and acting directly or through an authorized representative.
10-26	Equipment	All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work.
10-27	Extra Work	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.
10-28	FAA	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
10-29	Federal Specifications	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.

Paragraph Number	Term	Definition
10-30	Force Account	<b>a.</b> Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis.
		<b>b.</b> Owner Force Account - Work performed for the project by the Owner's employees.
10-31	Intention of Terms	Whenever, in these specifications or on the plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner. Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.
10-32	Lighting	A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.
10-33	Major and Minor Contract Items	A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.
10-34	Materials	Any substance specified for use in the construction of the contract work.
10-35	Modification of Standards (MOS)	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.
10-36	Notice to Proceed (NTP)	A written notice to the Contractor to begin the actual

Paragraph Number	Term	Definition
		contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.
10-37	Owner	The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is the Board of County Commissioners of Washington County, Maryland.
10-38	Passenger Facility	Per 14 Code of Federal Regulations (CFR) Part 158 and
	Charge (PFC)	49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers
		enplaned at a commercial service airport it controls.
10-39	Pavement Structure	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
10-40	Payment bond	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.
10-41	Performance bond	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
10-42	Plans	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'
10-43	Project	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.
10-44	Proposal	The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.
10-45	Proposal guaranty	The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.
10-46	Quality Assurance (OA)	Owner's responsibility to assure that construction work completed complies with specifications for payment.

Paragraph Number	Term	Definition
10-47	Quality Control (QC)	Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.
10-48	Quality Assurance (QA) Inspector	An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.
10-49	Quality Assurance (QA) Laboratory	The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer or RPR. May also be referred to as Engineer's, Owner's, or QA Laboratory.
10-50	Resident Project Representative (RPR)	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor and acting directly or through an authorized representative. May also be referred to as the Construction Manager, Engineer or Owner's Representative.
10-51	Runway	The area on the airport prepared for the landing and takeoff of aircraft.
10-52	Runway Safety Area (RSA)	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.
10-53	Safety Plan Compliance Document (SPCD)	Details how the Contractor will comply with the CSPP.
10-54	Specifications	A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.
10-55	Sponsor	A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.

Paragraph Number	Term	Definition
10-56	Structures	Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.
10-57	Subgrade	The soil that forms the pavement foundation.
10-58	Superintendent	The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the RPR, and who shall supervise and direct the construction.
10-59	Supplemental Agreement	<ul> <li>A written agreement between the Contractor and the</li> <li>Owner that establishes the basis of payment and</li> <li>contract time adjustment, if any, for the work affected</li> <li>by the supplemental agreement. A supplemental</li> <li>agreement is required if: (1) in scope work would</li> <li>increase or decrease the total amount of the awarded</li> <li>contract by more than 25%: (2) in scope work would</li> <li>increase or decrease the total of any major contract item</li> <li>by more than 25%; (3) work that is not within the scope</li> <li>of the originally awarded contract; or (4) adding or</li> <li>deleting of a major contract item.</li> </ul>
10-60	Surety	The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.
10-61	Taxilane	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.
10-62	Taxiway	The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.
10-63	Taxiway/Taxilane Safety Area (TSA)	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.
10-64	Work	The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.

Paragraph Number	Term	Definition
10-65	Working day	A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.
10-66	Owner Defined Terms	Airport Design Consultants, Inc. will act as the Construction Manager (CM) on behalf of the Owner for this contract.

### **END OF SECTION 10**

#### Section 20 Proposal Requirements and Conditions

#### 20-01 Advertisement (Notice to Bidders).

#### See Invitation to Bid located at the beginning of the bid book.

**20-02 Qualification of bidders**. Each bidder shall submit evidence of competency and evidence of financial responsibility to perform the work to the Owner at the time of bid opening.

Evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, and a list of equipment and a list of key personnel that would be available for the work.

Each bidder shall furnish the Owner satisfactory evidence of their financial responsibility. Evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether their financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect the bidder's true financial condition at the time such qualified statement or report is submitted to the Owner.

Unless otherwise specified, a bidder may submit evidence that they are prequalified with the State Highway Division and are on the current "bidder's list" of the state in which the proposed work is located. Evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

**20-03 Contents of proposal forms**. The Owner's proposal forms state the location and description of the proposed construction; the place, date, and time of opening of the proposals; and the estimated quantities of the various items of work to be performed and materials to be furnished for which unit bid prices are asked. The proposal form states the time in which the work must be completed, and the amount of the proposal guaranty that must accompany the proposal. The Owner will accept only those Proposals properly executed on physical forms or electronic forms provided by the Owner. Bidder actions that may cause the Owner to deem a proposal irregular are given in paragraph 20-09 *Irregular proposals*.

A pre-bid conference is required on this project to discuss as a minimum, the following items: material requirements; submittals; Quality Control/Quality Assurance requirements; the construction safety and phasing plan including airport access and staging areas; and unique airfield paving construction requirements. Pre-bid conference at 1:30 P.M., (EDST), Wednesday, May 15, 2019 at the Hagerstown Regional Airport – Richard A. Henson Field 18434 Showalter Road, Hagerstown, Maryland.

**20-04 Issuance of proposal forms**. The Owner reserves the right to refuse to issue aproposal form to a prospective bidder if the bidder is in default for any of the following reasons:

**a.** Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.

**b.** Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force with the Owner at the time the Owner issues the proposal to a prospective bidder.

c. Documented record of Contractor default under previous contracts with the Owner.

d. Documented record of unsatisfactory work on previous contracts with the Owner.

**20-05 Interpretation of estimated proposal quantities**. An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly, or by implication, agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as provided in the Section 40, paragraph 40-02, Alteration of Work and Quantities, without in any way invalidating the unit bid prices.

**20-06 Examination of plans, specifications, and site**. The bidder is expected to carefully examine the site of the proposed work, the proposal, plans, specifications, and contract forms. Bidders shall satisfy themselves to the character, quality, and quantities of work to be performed, materials to be furnished, and to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied to the conditions to be encountered in performing the work and the requirements of the proposed contract, plans, and specifications.

Boring logs and other records of subsurface investigations and tests are available for inspection of bidders. It is understood and agreed that such subsurface information, whether included in the plans, specifications, or otherwise made available to the bidder, was obtained and is intended for the Owner's design and estimating purposes only. Such information has been made available for the convenience of all bidders. It is further understood and agreed that each bidder is solely responsible for all assumptions, deductions, or conclusions which the bidder may make or obtain from their own examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

**20-07 Preparation of proposal**. The bidder shall submit their proposal on the forms furnished by the Owner. All blank spaces in the proposal forms, unless explicitly stated otherwise, must be correctly filled in where indicated for each and every item for which a quantity is given. The bidder shall state the price (written in ink or typed) both in words and numerals which they propose for each pay item furnished in the proposal. In case of conflict between words and

numerals, the words, unless obviously incorrect, shall govern.

Prices should generally be written in whole dollars and cents. The extended total amount of each item should not be rounded.

The bidder shall correctly sign the proposal in ink. If the proposal is made by an individual, their name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the proposal shall give the name of the state where the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of their authority to do so and that the signature is binding upon the firm or corporation.

**20-08 Responsive and responsible bidder.** A responsive bid conforms to all significant terms and conditions contained in the Owner's invitation for bid. It is the Owner's responsibility to decide if the exceptions taken by a bidder to the solicitation are material or not and the extent of deviation it is willing to accept.

A responsible bidder has the ability to perform successfully under the terms and conditions of a proposed procurement, as defined in 2 CFR § 200.318(h). This includes such matters as Contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.

**20-09 Irregular proposals**. Proposals shall be considered irregular for the following reasons:

**a.** If the proposal is on a form other than that furnished by the Owner, or if the Owner's form is altered, or if any part of the proposal form is detached.

**b.** If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.

**c.** If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.

**d.** If the proposal contains unit prices that are obviously unbalanced.

e. If the proposal is not accompanied by the proposal guaranty specified by the Owner.

f. If the applicable Disadvantaged Business Enterprise information is incomplete.

The Owner reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.

**20-10 Bid guarantee**. Each separate proposal shall be accompanied by a bid bond, certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such bond, check, or collateral shall be made payable to the Owner.

The bid guarantee shall be equivalent to 5% of the bid price. It shall consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of the bid, execute such contractual documents as may be required within the time specified.

**20-11 Delivery of proposal.** Each proposal submitted shall be placed in a sealed envelope plainly marked with the project number, location of airport, and name and business address of the bidder on the outside. When sent by mail, preferably registered, the sealed proposal, marked as indicated above, should be enclosed in an additional envelope. No proposal will be considered unless received at the place specified in the invitation to bid or as modified by Addendum before the time specified for opening all bids. Proposals received after the bid opening time shall be returned to the bidder unopened.

**20-12 Withdrawal or revision of proposals**. A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder's request for withdrawal is received by the Owner in writing before the time specified for opening bids. Revised proposals must be received at the place specified in the advertisement before the time specified for opening all bids.

**20-13 Public opening of proposals**. Proposals shall be opened, and read, publicly at the time and place specified in the advertisement. Bidders, their authorized agents, and other interested persons are invited to attend. Proposals that have been withdrawn (by written or telegraphic request) or received after the time specified for opening bids shall be returned to the bidder unopened.

**20-14 Disqualification of bidders**. A bidder shall be considered disqualified for any of the following reasons:

**a.** Submitting more than one proposal from the same partnership, firm, or corporation under the same or different name.

**b.** Evidence of collusion among bidders. Bidders participating in such collusion shall be disqualified as bidders for any future work of the Owner until any such participating bidder has been reinstated by the Owner as a qualified bidder.

**c.** If the bidder is considered to be in "default" for any reason specified in paragraph 20-04, *Issuance of Proposal Forms*, of this section.

**20-15 Discrepancies and Omissions.** A Bidder who discovers discrepancies or omissions with the project bid documents shall immediately notify the Owner of the matter. A bidder that has doubt as to the true meaning of a project requirement may submit to the Owner's Engineer a written request for interpretation no later than the questions cutoff date.

Any interpretation of the project bid documents by the Owner's Engineer will be by written addendum issued by the Owner. The Owner will not consider any instructions, clarifications or interpretations of the bidding documents in any manner other than written addendum.

#### **END OF SECTION 20**

#### Section 30 Award and Execution of Contract

**30-01 Consideration of proposals.** After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. If a bidder's proposal contains a discrepancy between unit bid prices written in words and unit bid prices written in numbers, the unit bid price written in words shall govern.

Until the award of a contract is made, the Owner reserves the right to reject a bidder's proposal for any of the following reasons:

**a.** If the proposal is irregular as specified in Section 20, paragraph 20-09, *Irregular Proposals*.

**b.** If the bidder is disqualified for any of the reasons specified Section 20, paragraph 20-14, *Disqualification of Bidders*.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals, waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise. All such actions shall promote the Owner's best interests.

**30-02** Award of contract. The award of a contract, if it is to be awarded, shall be made within 120 calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

If the Owner elects to proceed with an award of contract, the Owner will make award to the responsible bidder whose bid, conforming with all the material terms and conditions of the bid documents, is the lowest in price.

**30-03 Cancellation of award**. The Owner reserves the right to cancel the award without liability to the bidder, except return of proposal guaranty, at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with paragraph 30-07 *Approval of Contract*.

**30-04 Return of proposal guaranty**. All proposal guaranties, except those of the two lowest bidders, will be returned immediately after the Owner has made a comparison of bids as specified in the paragraph 30-01, *Consideration of Proposals*. Proposal guaranties of the two lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder's proposal guaranty will be returned. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in paragraph 30-05, *Requirements of Contract Bonds*.

30-05 Requirements of contract bonds. At the time of the execution of the contract, the

successful bidder shall furnish the Owner a surety bond or bonds that have been fully executed by the bidder and the surety guaranteeing the performance of the work and the payment of all legal debts that may be incurred by reason of the Contractor's performance of the work. The surety and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

**30-06 Execution of contract**. The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return the signed contract to the Owner, along with the fully executed surety bond or bonds specified in paragraph 30-05, *Requirements of Contract Bonds*, of this section, within 15 calendar days from the date mailed or otherwise delivered to the successful bidder.

**30-07 Approval of contract**. Upon receipt of the contract and contract bond or bonds that have been executed by the successful bidder, the Owner shall complete the execution of the contract in accordance with local laws or ordinances and return the fully executed contract to the Contractor. Delivery of the fully executed contract to the Contractor shall constitute the Owner's approval to be bound by the successful bidder's proposal and the terms of the contract.

**30-08 Failure to execute contract**. Failure of the successful bidder to execute the contract and furnish an acceptable surety bond or bonds within the period specified in paragraph 30-06, *Execution of Contract*, of this section shall be just cause for cancellation of the award and forfeiture of the proposal guaranty, not as a penalty, but as liquidated damages to the Owner.

#### **END OF SECTION 30**

#### Section 40 Scope of Work

**40-01 Intent of contract**. The intent of the contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract.

**40-02** Alteration of work and quantities. The Owner reserves the right to make such changes in quantities and work as may be necessary or desirable to complete, in a satisfactory manner, the original intended work. Unless otherwise specified in the Contract, the Owner's Engineer or RPR shall be and is hereby authorized to make, in writing, such in-scope alterations in the work and variation of quantities as may be necessary to complete the work, provided such action does not represent a significant change in the character of the work.

For purpose of this section, a significant change in character of work means: any change that is outside the current contract scope of work; any change (increase or decrease) in the total contract cost by more than 25%; or any change in the total cost of a major contract item by more than 25%.

Work alterations and quantity variances that do not meet the definition of significant change in character of work shall not invalidate the contract nor release the surety. Contractor agrees to accept payment for such work alterations and quantity variances in accordance with Section 90, paragraph 90-03, *Compensation for Altered Quantities*.

Should the value of altered work or quantity variance meet the criteria for significant change in character of work, such altered work and quantity variance shall be covered by a supplemental agreement. Supplemental agreements shall also require consent of the Contractor's surety and separate performance and payment bonds. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

**40-03 Omitted items**. The Owner, the Owner's Engineer or the RPR may provide written notice to the Contractor to omit from the work any contract item that does not meet the definition of major contract item. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be non-performed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with Section 90, paragraph 90-04, *Payment for Omitted Items*.

**40-04 Extra work**. Should acceptable completion of the contract require the Contractor to perform an item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, Owner may issue a Change Order to cover the necessary extra work.

Change orders for extra work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order and shall contain any adjustment to the contract time that, in the RPR's opinion, is necessary for completion of the extra work.

When determined by the RPR to be in the Owner's best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *Payment for Extra Work*. Extra work that is necessary for acceptable completion of the project, but is not within the general scope of the work covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, *Supplemental Agreement*.

If extra work is essential to maintaining the project critical path, RPR may order the Contractor to commence the extra work under a Time and Material contract method. Once sufficient detail is available to establish the level of effort necessary for the extra work, the Owner shall initiate a change order or supplemental agreement to cover the extra work.

Any claim for payment of extra work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner.

All change orders, supplemental agreements, and contract modifications must eventually be reviewed by the FAA. Unless specifically requested by the FAA, the Owner does not have to obtain prior FAA approval for contract changes except for the Buy American review, if required. However, if an Owner proceeds with contract changes without FAA approval, it is at the Owner's risk.

**40-05 Maintenance of traffic**. It is the explicit intention of the contract that the safety of aircraft, as well as the Contractor's equipment and personnel, is the most important consideration. The Contractor shall maintain traffic in the manner detailed in the Construction Safety and Phasing Plan (CSPP).

**a.** It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in Section 80, paragraph 80-04, *Limitation of Operations*. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in Section 70, paragraph 70-15, *Contractor's Responsibility for Utility Service and Facilities of Others*.

**b.** With respect to their own operations and the operations of all subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work area or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicles at the airport in accordance with the construction safety and phasing plan (CSPP) and the safety plan compliance document (SPCD).

Refer to AC 150/5210-5, Painting, Marking and Lighting of Vehicles Used on an Airport and AC 150/5370-2, Operational Safety on Airports During Construction for applicable standards.

c. When the contract requires the maintenance of an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep the road, street, or highway open to all traffic and shall provide maintenance as may be required to accommodate traffic. The Contractor, at their expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel. The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable Manual on Traffic Uniform with the Control Devices conformity (MUTCD) (http://mutcd.fhwa.dot.gov/), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways. Unless otherwise specified herein, the Contractor will not be required to furnish snow removal for such existing road, street, or highway.

**40-06 Removal of existing structures**. All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Resident Project Representative (RPR) shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the RPR in accordance with the provisions of the contract.

Except as provided in Section 40, paragraph 40-07, *Rights in and Use of Materials Found in the Work*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

The removal of large or complicated existing structures such as box-culverts, underground storage tanks, large underground electrical vaults, large reinforced concrete structures or foundations, or similar existing airport facilities should be provided for in separate technical specifications. Contract pay items should also be provided in the contract proposal to cover payment for such work.

**40-07 Rights in and use of materials found in the work**. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

**a.** Use such material in another contract item, providing such use is approved by the RPR and is in conformance with the contract specifications applicable to such use; or,

**b.** Remove such material from the site, upon written approval of the RPR; or

c. Use such material for the Contractor's own temporary construction on site; or,

**d.** Use such material as intended by the terms of the contract.

Should the Contractor wish to exercise option a., b., or c., the Contractor shall request the RPR's approval in advance of such use.

Should the RPR approve the Contractor's request to exercise option a., b., or c., the Contractor shall be paid for the excavation or removal of such material at the applicable contract price. The Contractor shall replace, at their expense, such removed or excavated material with an agreed equal volume of material that is acceptable for use in constructing embankment, backfills, or otherwise to the extent that such replacement material is needed to complete the contract work. The Contractor shall not be charged for use of such material used in the work or removed from the site.

Should the RPR approve the Contractor's exercise of option a., the Contractor shall be paid, at the applicable contract price, for furnishing and installing such material in accordance with requirements of the contract item in which the material is used.

It is understood and agreed that the Contractor shall make no claim for delays by reason of their own exercise of option a., b., or c.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside the lines, grades, or grading sections established for the work, except where such excavation or removal is provided for in the contract, plans, or specifications.

**40-08 Final cleanup**. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. The Contractor shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of the property Owner.

### **END OF SECTION 40**

Section 50 Control of Work

**50-01 Authority of the Resident Project Representative (RPR)**. The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements.

**50-02 Conformity with plans and specifications**. All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross-sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans, or specifications.

If the RPR finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications, but that the portion of the work affected will, in their opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the RPR will advise the Owner of their determination that the affected work be accepted and remain in place. The RPR will document the determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. Changes in the contract price must be covered by contract change order or supplemental agreement as applicable.

If the RPR finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the RPR's written orders.

The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the RPR's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's execution of the work, when, in the RPR's opinion, such compliance is essential to provide an acceptable finished portion of the work.

The term "reasonably close conformity" is also intended to provide the RPR with the authority, after consultation with the Sponsor and FAA, to use sound engineering judgment in their determinations to accept work that is not in strict conformity, but will provide a finished product equal to or better than that required by the requirements of the contract, plans and specifications.

The RPR will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

**50-03 Coordination of contract, plans, and specifications**. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding
as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited standards for materials or testing and cited ACs. If any paragraphs contained in the General Conditions, Supplemental Terms and Conditions and Special Provisions conflict with General Provisions or Technical Specifications, the General Conditions, Supplemental Terms and Conditions and Special Provisions shall govern.

From time to time, discrepancies within cited testing standards occur due to the timing of the change, edits, and/or replacement of the standards. If the Contractor discovers any apparent discrepancy within standard test methods, the Contractor shall immediately ask the RPR for an interpretation and decision, and such decision shall be final.

The Contractor shall not take advantage of any apparent error or omission on the plans or specifications. In the event the Contractor discovers any apparent error or discrepancy, Contractor shall immediately notify the Owner or the designated representative in writing requesting their written interpretation and decision.

#### 50-04 List of Special Provisions. Not Used.

**50-05 Cooperation of Contractor**. The Contractor shall be supplied with five hard copies or an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the work to facilitate the progress thereof and shall cooperate with the RPR and their inspectors and with other Contractors in every way possible. The Contractor shall have a competent superintendent on the work at all times who is fully authorized as their agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the RPR or their authorized representative.

**50-06 Cooperation between Contractors**. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct the work not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with their own contract and shall protect and hold harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced because of the presence and operations of other Contractors working within the limits of the same project.

The Contractor shall arrange their work and shall place and dispose of the materials being used to not interfere with the operations of the other Contractors within the limits of the same project. The Contractor shall join their work with that of the others in an acceptable manner and shall

perform it in proper sequence to that of the others.

**50-07 Construction layout and stakes**. The Engineer/RPR shall establish necessary horizontal and vertical control. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor. Contractor is responsible for preserving integrity of horizontal and vertical controls established by Engineer/RPR. In case of negligence on the part of the Contractor or their employees, resulting in the destruction of any horizontal and vertical control, the resulting costs will be deducted as a liquidated damage against the Contractor.

Prior to the start of construction, the Contractor will check all control points for horizontal and vertical accuracy and certify in writing to the RPR that the Contractor concurs with survey control established for the project. All lines, grades and measurements from control points necessary for the proper execution and control of the work on this project will be provided to the RPR. The Contractor is responsible to establish all layout required for the construction of the project.

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. Survey(s) and notes shall be provided in the following format(s): LandXML, AuotCAD .dwg file format (2018) and PDF.

Laser, GPS, String line, or other automatic control shall be checked with temporary control as necessary. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

No direct payment will be made, unless otherwise specified in contract documents, for this labor, materials, or other expenses. The cost shall be included in the price of the bid for the various items of the Contract.

**50-08** Authority and duties of Quality Assurance (QA) inspectors. QA inspectors shall be authorized to inspect all work done and all material furnished. Such QA inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. QA inspectors are not authorized to revoke, alter, or waive any provision of the contract. QA inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

QA Inspectors are authorized to notify the Contractor or their representatives of any failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the RPR for a decision.

**50-09 Inspection of the work**. All materials and each part or detail of the work shall be subject to inspection. The RPR shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the RPR requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Provide advance written notice to the RPR of work the Contractor plans to perform each week and each day. Any work done or materials used without written notice and allowing opportunity for inspection by the RPR may be ordered removed and replaced at the Contractor's expense.

Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility owner a party to the contract and shall in no way interfere with the rights of the parties to this contract.

**50-10 Removal of unacceptable and unauthorized work**. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the RPR as provided in paragraph 50-02, *Conformity with Plans and Specifications*.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of Section 70, paragraph 70-14, *Contractor's Responsibility for Work*.

No removal work made under provision of this paragraph shall be done without lines and grades having been established by the RPR. Work done contrary to the instructions of the RPR, work done beyond the lines shown on the plans or as established by the RPR, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the RPR made under the provisions of this subsection, the RPR will have authority to cause unacceptable work to be remedied or removed and replaced; and unauthorized work to be removed and recover the resulting costs as a liquidated damage against the Contractor.

**50-11 Load restrictions**. The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor,

at their own expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel.

**50-12 Maintenance during construction**. The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a contract for the placing of a course upon a course or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

**50-13 Failure to maintain the work**. Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, *Maintenance during Construction*, the RPR shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the RPR's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be recovered as a liquidated damage against the Contractor.

**50-14 Partial acceptance**. If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the RPR to make final inspection of that unit. If the RPR finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the RPR may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

**50-15 Final acceptance.** Upon due notice from the Contractor of presumptive completion of the entire project, the RPR and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The RPR shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the RPR will notify the Contractor and the Contractor shall correct the unsatisfactory work. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the RPR will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

**50-16 Claims for adjustment and disputes.** If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract,

plans, or specifications or previously authorized as extra work, the Contractor shall notify the RPR in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the RPR is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the RPR has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the RPR who will present it to the Owner for consideration in accordance with local laws or ordinances.

Nothing in this subsection shall be construed as a waiver of the Contractor's right to dispute

final payment based on differences in measurements or computations.

50-17 Value Engineering Cost Proposal. Not Used.

#### **END OF SECTION 50**

## **Section 60 Control of Materials**

**60-01 Source of supply and quality requirements**. The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the RPR as to the origin, composition, and manufacture of all materials to be used in the work. Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

At the RPR's option, materials may be approved at the source of supply before delivery. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the Contractor shall furnish materials from other sources.

The Contractor shall furnish airport lighting equipment that meets the requirements of the specifications; and is listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program* and *Addendum*, that is in effect on the date of advertisement.

**60-02 Samples, tests, and cited specifications**. All materials used in the work shall be inspected, tested, and approved by the RPR before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the RPR shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the RPR, shall be removed at the Contractor's expense.

Unless otherwise designated, quality assurance tests will be made by and at the expense of the Owner in accordance with the cited standard methods of ASTM, American Association of State Highway and Transportation Officials (AASHTO), federal specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids.

The testing organizations performing on-site quality assurance field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the RPR. All materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation into the work. Copies of all tests will be furnished to the Contractor's representative at their request after review and approval of the RPR.

A copy of all Contractor QC test data shall be provided to the RPR daily, along with printed reports, in an approved format, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the RPR showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

The Contractor shall employ a Quality Control (QC) testing organization to perform all Contractor required QC tests in accordance with Item C-100 Contractor Quality Control Program(CQCP).

60-03 Certification of compliance/analysis (COC/COA). The RPR may permit the use, prior to

sampling and testing, of certain materials or assemblies when accompanied by manufacturer's COC stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified. The COA is the manufacturer's COC and includes all applicable test results.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as approved by the RPR. When a material or assembly is specified by "brand name or equal" and the Contractor elects to furnish the specified "or equal," the Contractor shall be required to furnish the manufacturer's certificate of compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

a. Conformance to the specified performance, testing, quality or dimensional requirements; and,

**b.** Suitability of the material or assembly for the use intended in the contract work.

The RPR shall be the sole judge as to whether the proposed "or equal" is suitable for use in the work.

The RPR reserves the right to refuse permission for use of materials or assemblies on the basis of certificates of compliance.

**60-04 Plant inspection**. The RPR or their authorized representative may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the work and to obtain samples required for acceptance of the material or assembly.

Should the RPR conduct plant inspections, the following conditions shall exist:

**a.** The RPR shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.

**b.** The RPR shall have full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.

**c.** If required by the RPR, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Place office or working space in a convenient location with respect to the plant.

It is understood and agreed that the Owner shall have the right to retest any material that has been tested and approved at the source of supply after it has been delivered to the site. The RPR shall have the right to reject only material which, when retested, does not meet the requirements of the contract, plans, or specifications.

**60-05 Engineer/ Resident Project Representative (RPR) field office**. The Contractor shall provide dedicated space for the use of the engineer, RPR, and inspectors, as a field office for the duration of the project. This space shall be located conveniently near the construction and shall

be separate from any space used by the Contractor. The Contractor shall furnish water, sanitary facilities, heat, air conditioning, and electricity.

**60-06 Storage of materials**. Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the RPR. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans and/or CSPP, the storage of materials and the location of the Contractor's plant and parked equipment or vehicles shall be as directed by the RPR. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the RPR a copy of the property Owner's permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at their expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

**60-07 Unacceptable materials**. Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the RPR.

Rejected material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the work until such time as the RPR has approved its use in the work.

**60-08 Owner furnished materials**. The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified.

All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the unit price bid for the contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

## END OF SECTION 60

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## Section 70 Legal Regulations and Responsibility to Public

**70-01 Laws to be observed**. The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner and all their officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's employees.

**70-02 Permits, licenses, and taxes**. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

**70-03 Patented devices, materials, and processes**. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the Patentee or Owner. The Contractor and the surety shall indemnify and hold harmless the Owner, any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

**70-04 Restoration of surfaces disturbed by others**. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner, such authorized work (by others) must be shown on the plans and is indicated as follows:

UTILITY	OWNER	PLAN SHEET	CONTACT
Power			
Gas			
Telecommunications			
FAA Facilities			

Except as listed above, the Contractor shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the RPR.

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the Contractor shall cooperate with such Owners by

arranging and performing the work in this contract to facilitate such construction, reconstruction or maintenance by others whether or not such work by others is listed above. When ordered as extra work by the RPR, the Contractor shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the contract, plans, or specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

**70-05 Federal Participation**. The United States Government has agreed to reimburse the Owner for some portion of the contract costs. The contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator. No requirement of this contract shall be construed as making the United States a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

**70-06 Sanitary, health, and safety provisions**. The Contractor's worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

**70-07 Public convenience and safety**. The Contractor shall control their operations and those of their subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to their own operations and those of their own subcontractors and all suppliers in accordance with Section 40, paragraph 40-05, *Maintenance of Traffic*, and shall limit such operations for the convenience and safety of the traveling public as specified in Section 80, paragraph 80-04, *Limitation of Operations*.

The Contractor shall remove or control debris and rubbish resulting from its work operations at frequent intervals, and upon the order of the RPR. If the RPR determines the existence of Contractor debris in the work site represents a hazard to airport operations and the Contractor is unable to respond in a prompt and reasonable manner, the RPR reserves the right to assign the task of debris removal to a third party and recover the resulting costs as a liquidated damage against the Contractor.

**70-08 Construction Safety and Phasing Plan (CSPP).** The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP is on sheet(s) GN03.100 through GN03.106 of the project plans.

**70-09 Use of explosives**. When the use of explosives is necessary for the execution of the work, the Contractor shall exercise the utmost care not to endanger life or property, including new work. The Contractor shall be responsible for all damage resulting from the use of explosives.

All explosives shall be stored in a secure manner in compliance with all laws and ordinances, and all such storage places shall be clearly marked. Where no local laws or ordinances apply, storage shall be provided satisfactory to the RPR and, in general, not closer than 1,000 feet (300 m) from the work or from any building, road, or other place of human occupancy.

The Contractor shall notify each property Owner and public utility company having structures or facilities in proximity to the site of the work of their intention to use explosives. Such notice shall be given sufficiently in advance to enable them to take such steps as they may deem necessary to protect

their property from injury.

The use of electrical blasting caps shall not be permitted on or within 1,000 feet (300 m) of the airport property.

**70-10 Protection and restoration of property and landscape**. The Contractor shall be responsible for the preservation of all public and private property and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer/RPR has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character, during the execution of the work, resulting from any act, omission, neglect, or misconduct in manner or method of executing the work, or at any time due to defective work or materials, and said responsibility shall not be released until the project has been completed and accepted.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore, at their expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or the Contractor shall make good such damage or injury in an acceptable manner.

**70-11 Responsibility for damage claims**. The Contractor shall indemnify and hold harmless the Engineer/RPR and the Owner and their officers, agents, and employees from all suits, actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of their own contract considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, their own surety may be held until such suits, actions, or claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that he or she is adequately protected by public liability and property damage insurance.

**70-12 Third party beneficiary clause**. It is specifically agreed between the parties executing the contract that it is not intended by any of the provisions of any part of the contract to create for the public or any member thereof, a third-party beneficiary or to authorize anyone not a party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the contract.

**70-13 Opening sections of the work to traffic**. If it is necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such "phasing" of the work must be specified below and indicated on the approved Construction Safety and Phasing Plan (CSPP) and the project plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise

specified.

Upon completion of any portion of work listed above, such portion shall be accepted by the Owner in accordance with Section 50, paragraph 50-14, *Partial Acceptance*.

No portion of the work may be opened by the Contractor until directed by the Owner in writing. Should it become necessary to open a portion of the work to traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the RPR, such portion of the work is in an acceptable condition to support the intended traffic. Temporary or intermittent openings are considered to be inherent in the work and shall not constitute either acceptance of the portion of the work so opened or a waiver of any provision of the contract. Any damage to the portion of the work so opened that is not attributable to traffic which is permitted by the Owner shall be repaired by the Contractor at their expense.

The Contractor shall make their own estimate of the inherent difficulties involved in completing the work under the conditions herein described and shall not claim any added compensation by reason of delay or increased cost due to opening a portion of the contract work.

The Contractor must conform to safety standards contained AC 150/5370-2 and the approved CSPP.

Contractor shall refer to the plans, specifications, and the approved CSPP to identify barricade requirements, temporary and/or permanent markings, airfield lighting, guidance signs and other safety requirements prior to opening up sections of work to traffic.

**70-14 Contractor's responsibility for work**. Until the RPR's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with Section 50, paragraph 50-14, *Partial Acceptance*, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at their own expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

**70-15** Contractor's responsibility for utility service and facilities of others. As provided in paragraph 70-04, *Restoration of Surfaces Disturbed by Others*, the Contractor shall cooperate with the owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the approximate locations have been indicated on the plans and/or in the contract documents.

Utility Service or Facility	Person to Contact	Contact
FAA – Martinsburg SSC	Mr. Mark Hayman	540-521-1622
Miss Utility		1-800-257-7777

It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor of the responsibility to protect such existing features from damage or unscheduled interruption of service.

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the Owners of all utility services or other facilities of their plan of operations. Such notification shall be in writing addressed to "The Person to Contact" as provided in this paragraph and paragraph 70-04, *Restoration of Surfaces Disturbed by Others*. A copy of each notification shall be given to the RPR.

In addition to the general written notification provided, it shall be the responsibility of the Contractor to keep such individual Owners advised of changes in their plan of operations that would affect such Owners.

Prior to beginning the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such Owner of their plan of operation. If, in the Contractor's opinion, the Owner's assistance is needed to locate the utility service or facility or the presence of a representative of the Owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner's "Person to Contact" no later than two normal business days prior to the Contractor's commencement of operations in such general vicinity. The Contractor shall furnish a written summary of the notification to the RPR.

The Contractor's failure to give the two days' notice shall be cause for the Owner to suspend the Contractor's operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use hand excavation methods within 3 feet (1 m) of such outside limits at such points as may be required to ensure protection from damage due to the Contractor's operations.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, the Contractor shall immediately notify the proper authority and the RPR and shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the RPR continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or

facility due to their operations whether due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor, or their own surety.

70-15.1 FAA facilities and cable runs. Not Used.

**70-16 Furnishing rights-of-way**. The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the Contractor's operations.

**70-17 Personal liability of public officials**. In carrying out any of the contract provisions or in exercising any power or authority granted by this contract, there shall be no liability upon the Engineer, RPR, their authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

**70-18 No waiver of legal rights**. Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the Contractor or their surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill their obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Owner's rights under any warranty or guaranty.

**70-19 Environmental protection**. The Contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment. The Contractor shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, asphalts, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

**70-20** Archaeological and historical findings. Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

Should the Contractor encounter, during their operations, any building, part of a building, structure, or object that is incongruous with its surroundings, the Contractor shall immediately cease operations in that location and notify the RPR. The RPR will immediately investigate the Contractor's finding and the Owner will direct the Contractor to either resume operations or to suspend operations as directed.

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *Extra Work*, and Section 90, paragraph 90-05, *Payment for Extra Work*. If appropriate, the contract change order or supplemental agreement shall include an extension of

contract time in accordance with Section 80, paragraph 80-07, *Determination and Extension of Contract Time*.

70-21 Insurance Requirements. See Washington County's Insurance Requirements for Independent Contractors Policy located in Section 1 of the Project Manual.

**END OF SECTION 70** 

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#### Section 80 Execution and Progress

**80-01 Subletting of contract**. The Owner will not recognize any subcontractor on the work. The Contractor shall at all times when work is in progress be represented either in person, by a qualified superintendent, or by other designated, qualified representative who is duly authorized to receive and execute orders of the Resident Project Representative (RPR).

The Contractor shall perform, with his organization, an amount of work equal to at least 25% percent of the total contract cost.

Should the Contractor elect to assign their contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner.

# The Contractor shall provide copies of all subcontracts to the RPR 14 days prior to being utilized on the project. As a minimum, the information shall include the following:

- Subcontractor's legal company name.
- Subcontractor's legal company address, including County name.
- Principal contact person's name, telephone and fax number.
- Complete narrative description, and dollar value of the work to be performed by the subcontractor.
- Copies of required insurance certificates in accordance with the specifications.
- Minority/ non-minority status.

**80-02 Notice to proceed (NTP)**. The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within 10 days of the NTP date. The Contractor shall notify the RPR at least 24 hours in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

**80-03 Execution and progress**. Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR's review and acceptance at least 10 days prior to the start of work. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the RPR's request, submit a revised schedule for completion of the work within the contract time and modify their operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the execution of the work be discontinued for any reason, the Contractor shall notify the RPR at least 24 hours in advance of resuming operations.

The Contractor shall not commence any actual construction prior to the date on which the NTP is issued by the Owner.

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), or another format, or as otherwise specified. It shall include information on the sequence of work activities, milestone dates, and activity duration. The schedule shall show all work items identified in the project proposal for each work area and shall include the project start date and end date.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

**80-04 Limitation of operations**. The Contractor shall control their operations and the operations of their subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in the air operations areas (AOA) of the airport.

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the RPR) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, *Construction Safety and Phasing Plan (CSPP)*.

The Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction and the approved CSPP.

**80-04.1 Operational safety on airport during construction.** All Contractors' operations shall be conducted in accordance with the approved project Construction Safety and Phasing Plan (CSPP) and the Safety Plan Compliance Document (SPCD) and the provisions set forth within the current version of AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a SPCD that details how it proposes to comply with the requirements presented within the CSPP.

The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks to assure compliance with the safety plan measures.

The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the project. The Contractor shall assure that all subcontractors are made aware of the requirements of the CSPP and SPCD and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP and SPCD unless approved in writing by the Owner. The necessary coordination actions to review Contractor proposed

modifications to an approved CSPP or approved SPCD can require a significant amount of time.

**80-05 Character of workers, methods, and equipment**. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any subcontractor who violates any operational regulations or operational safety requirements and, in the opinion of the RPR, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the RPR, be removed immediately by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the RPR.

Should the Contractor fail to remove such person or persons or fail to furnish suitable and sufficient personnel for the proper execution of the work, the RPR may suspend the work by written notice until compliance with such orders.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall not cause injury to previously completed work, adjacent property, or existing airport facilities due to its use.

When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless otherwise authorized by the RPR. If the Contractor desires to use a method or type of equipment other than specified in the contract, the Contractor may request authority from the RPR to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the RPR determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality or take such other corrective action as the RPR may direct. No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this paragraph.

**80-06 Temporary suspension of the work**. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods the Owner may deem necessary, due to unsuitable weather, or other conditions considered unfavorable for the execution of the work, or for such time necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some

unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

If it becomes necessary to suspend work for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. The Contractor shall take every precaution to prevent damage or deterioration of the work performed and provide for normal drainage of the work. The Contractor shall erect temporary structures where necessary to provide for traffic on, to, or from the airport.

**80-07 Determination and extension of contract time**. The number of calendar days shall be stated in the proposal and contract and shall be known as the Contract Time. If the contract time requires extension for reasons beyond the Contractor's control, it shall be adjusted as follows:

**80-07.1 Contract time based on calendar days.** Contract Time based on calendar days shall consist of the number of calendar days stated in the contract counting from the effective date of the Notice to Proceed and including all Saturdays, Sundays, holidays, and non-work days. All calendar days elapsing between the effective dates of the Owner's orders to suspend and resume all work, due to causes not the fault of the Contractor, shall be excluded.

At the time of final payment, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in the contract time shall not consider either cost of work or the extension of contract time that has been covered by a change order or supplemental agreement. Charges against the contract time will cease as of the date of final acceptance.

**80-08 Failure to complete on time**. For each calendar day or working day, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in paragraph 80-07, *Determination and Extension of Contract Time*) the sum specified in the contract and proposal as liquidated damages (LD) will be deducted from any money due or to become due the Contractor or their own surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract. See the Form of Proposal located in the beginning of the Project Manual for Liquidated Damages.

Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a wavier on the part of the Owner of any of its rights under the contract.

80-09 Default and termination of contract. The Contractor shall be considered in default of their

contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

**a.** Fails to begin the work under the contract within the time specified in the Notice to Proceed, or

**b.** Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or

**c.** Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or

**d.** Discontinues the execution of the work, or

**e.** Fails to resume work which has been discontinued within a reasonable time after notice to do so, or

f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or

**g.** Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or

h. Makes an assignment for the benefit of creditors, or

i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Owner consider the Contractor in default of the contract for any reason above, the Owner shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

If the Contractor or surety, within a period of 10 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the RPR of the facts of such delay, neglect, or default and the Contractor's failure to comply with such notice, have full power and authority without violating the contract, to take the execution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said contract according to the terms and provisions thereof or use such other methods as in the opinion of the RPR will be required for the completion of said contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under contract, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

**80-10 Termination for national emergencies**. The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

When the contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the RPR.

Termination of the contract or a portion thereof shall neither relieve the Contractor of their responsibilities for the completed work nor shall it relieve their surety of its obligation for and concerning any just claim arising out of the work performed.

**80-11 Work area, storage area and sequence of operations**. The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate work in accordance with the approved CSPP and SPCD.

## **END OF SECTION 80**

#### **Section 90 Measurement and Payment**

**90-01 Measurement of quantities**. All work completed under the contract will be measured by the RPR, or their authorized representatives, using United States Customary Units of Measurement.

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet (0.8 square meters) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the RPR.

Unless otherwise specified, all contract items which are measured by the linear foot such as electrical ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

The term "lump sum" when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

When requested by the Contractor and approved by the RPR in writing, material specified to be measured by the cubic yard (cubic meter) may be weighed, and such weights will be converted to cubic yards (cubic meters) for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the RPR and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Term	Description
Excavation and Embankment	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
Volume	
Measurement	The term "ton" will mean the short ton consisting of 2,000 pounds (907 km)
and Proportion	avoirdupois. All materials that are measured or proportioned by weights shall
by Weight	be weighed on accurate, independently certified scales by competent,
	qualified personnel at locations designated by the RPR. If material is shipped
	by rail, the car weight may be accepted provided that only the actual weight
	of material is paid for. However, car weights will not be acceptable for
	material to be passed through mixing plants. Trucks used to haul material
	being paid for by weight shall be weighed empty daily at such times as the

#### **Measurement and Payment Terms**

Term	Description	
	RPR directs, and each truck shall bear a plainly legible identification mark.	
Measurement by Volume	Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable for the materials hauled, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.	
Asphalt Material	Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when asphalt material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work. When asphalt materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, will be used for computing quantities.	
Cement	Cement will be measured by the ton (kg) or hundredweight (km).	
Structure	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.	
Timber	Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.	
Plates and Sheets	The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.	
Miscellaneous Items	When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.	
Scales	Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end. Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the	

Term	Description
	observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the scale, but not less than one pound (454 grams). The use of spring balances will not be permitted.
	In the event inspection reveals the scales have been "overweighing" (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%.
	In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded.
	Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them.
	Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment.
	All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.
Rental Equipment	Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 <i>Payment for Extra Work</i> .
Pay Quantities	When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

**90-02 Scope of payment**. The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials, for performing all work under the contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character

arising out of the nature of the work or the execution thereof, subject to the provisions of Section 70, paragraph 70-18, *No Waiver of Legal Rights*.

When the "basis of payment" subsection of a technical specification requires that the contract price (price bid) include compensation for certain work or material essential to the item, this same work or material will not also be measured for payment under any other contract item which may appear elsewhere in the contract, plans, or specifications.

**90-03 Compensation for altered quantities**. When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph 40-02, *Alteration of Work and Quantities*, will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from their own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

**90-04 Payment for omitted items**. As specified in Section 40, paragraph 40-03, *Omitted Items*, the RPR shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the RPR omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the RPR's order to omit or non-perform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the RPR's order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the RPR's order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

**90-05 Payment for extra work**. Extra work, performed in accordance with Section 40, paragraph 40-04, *Extra Work*, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

**90-06 Partial payments**. Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the RPR, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with paragraph 90-07, *Payment for Materials on Hand*. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

a. From the total of the amount determined to be payable on a partial payment, 5% percent of such total amount will be deducted and retained by the Owner for protection of the Owner's interests.

Unless otherwise instructed by the Owner, the amount retained by the Owner will be in effect until the final payment is made except as follows:

(1) Contractor may request release of retainage on work that has been partially accepted by the Owner in accordance with Section 50-03. Contractor must provide a certified invoice to the RPR that supports the value of retainage held by the Owner for partially accepted work.

(2) In lieu of retainage, the Contractor may exercise at its option the establishment of an escrow account per paragraph 90-08.

b. The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 30 days after the Contractor has received a partial payment. Contractor must provide the Owner evidence of prompt and full payment of retainage held by the prime Contractor to the subcontractor within 30 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

c. When at least 95% of the work has been completed to the satisfaction of the RPR, the RPR shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the contract value and the cost of the remaining work to be done. The Owner may retain an amount not less than twice the contract value or estimated cost, whichever is greater, of the work remaining to be done. The remainder, less all previous payments and deductions, will then be certified for payment to the Contractor.

It is understood and agreed that the Contractor shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the RPR to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in paragraph 90-09, *Acceptance and Final Payment*.

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

**90-07 Payment for materials on hand.** Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

**a.** The material has been stored or stockpiled in a manner acceptable to the RPR at or on an approved site.

**b.** The Contractor has furnished the RPR with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

**c.** The Contractor has furnished the RPR with satisfactory evidence that the material and transportation costs have been paid.

**d.** The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material stored or stockpiled.

**e.** The Contractor has furnished the Owner evidence that the material stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the Contractor of their responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications.

In no case will the amount of partial payments for materials on hand exceed the contract price for such materials or the contract price for the contract item in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

**90-08 Payment of withheld funds**. At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

**a.** The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.

**b.** The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.

c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.

**d.** The Contractor shall obtain the written consent of the surety to such agreement.

**90-09** Acceptance and final payment. When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all

disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

After the Contractor has approved, or approved under protest, the RPR's final estimate, and after the RPR's receipt of the project closeout documentation required in paragraph 90-11, *Contractor Final Project Documentation*, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of Section 50, paragraph 50-16, *Claims for Adjustments and Disputes*, or under the provisions of this paragraph, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

#### 90-10 Construction warranty.

**a.** In addition to any other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.

**b.** This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the project work. Light Emitting Diode emitting diode (LED) light fixtures with the exception of obstruction lighting, must be warranted by the manufacturer for a minimum of four (4) years after date of installation inclusive of all electronics.

**c.** The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Owner real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.

**d.** The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.

**e.** The Owner will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage.

**f.** If the Contractor fails to remedy any failure, defect, or damage within 14 days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

**g.** With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.

**h.** This warranty shall not limit the Owner's rights with respect to latent defects, gross mistakes, or fraud.

**90-11 Contractor Final Project Documentation.** Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor's final submittal. The Contractor shall:

**a.** Provide two (2) copies of all manufacturer's warranties specified for materials, equipment, and installations.

**b.** Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.

c. Complete final cleanup in accordance with Section 40, paragraph 40-08, Final Cleanup.

**d.** Complete all punch list items identified during the Final Inspection.

e. Provide complete release of all claims for labor and material arising out of the Contract.

**f.** Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the project.

g. When applicable per state requirements, return copies of sales tax completion forms.

h. Manufacturer's certifications for all items incorporated in the work.

i. All required record drawings, as-built drawings or as-constructed drawings.

**j.** Project Operation and Maintenance (O&M) Manual(s).

k. Security for Construction Warranty.

**l.** Equipment commissioning documentation submitted, if required.

## END OF SECTION 90

## Item C-100 Contractor Quality Control Program (CQCP)

**100-1 General.** Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving a quality project. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The Contractor shall establish a CQCP that will:

- **a.** Provide qualified personnel to develop and implement the CQCP.
- **b.** Provide for the production of acceptable quality materials.
- c. Provide sufficient information to assure that the specification requirements can be met.
- **d.** Document the CQCP process.

The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the CQCP has been reviewed and approved by the Resident Project Representative (RPR). No partial payment will be made for materials subject to specific quality control (QC) requirements until the CQCP has been reviewed and approved.

The QC requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the quality assurance (QA) testing requirements. QA testing requirements are the responsibility of the RPR or Contractor as specified in the specifications.

A Quality Control (QC)/Quality Assurance (QA) workshop with the Engineer, Resident Project Representative (RPR), Contractor, subcontractors, testing laboratories, and Owner's representative must be held prior to start of construction. The QC/QA workshop will be facilitated by the Contractor. The Contractor shall coordinate with the Airport and the RPR on time and location of the QC/QA workshop. Items to be addressed, at a minimum, will include:

**a.** Review of the CQCP including submittals, QC Testing, Action & Suspension Limits for Production, Corrective Action Plans, Distribution of QC reports, and Control Charts.

**b.** Discussion of the QA program.

**c.** Discussion of the QC and QA Organization and authority including coordination and information exchange between QC and QA.

- **d.** Establish regular meetings to discuss control of materials, methods and testing.
- e. Establishment of the overall QC culture.

#### 100-2 Description of program.

**a. General description.** The Contractor shall establish a CQCP to perform QC inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of QC.

**b.** Contractor Quality Control Program (CQCP). The Contractor shall describe the CQCP in a written document that shall be reviewed and approved by the RPR prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the RPR for review and approval at least 10 calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the RPR prior to the Notice to Proceed (NTP).

The CQCP shall be organized to address, as a minimum, the following:

- 1. QC organization and resumes of key staff
- 2. Project progress schedule
- 3. Submittals schedule
- 4. Inspection requirements
- 5. QC testing plan
- 6. Documentation of QC activities and distribution of QC reports
- 7. Requirements for corrective action when QC and/or QA acceptance criteria are not met
- 8. Material quality and construction means and methods. Address all elements applicable to the project that affect the quality of the pavement structure including subgrade, subbase, base, and surface course. Some elements that must be addressed include, but is not limited to mix design, aggregate grading, stockpile management, mixing and transporting, placing and finishing, quality control

testing and inspection, smoothness, laydown plan, equipment, and temperature management plan.

The Contractor must add any additional elements to the CQCP that is necessary to adequately control all production and/or construction processes required by this contract.

**100-3 CQCP organization.** The CQCP shall be implemented by the establishment of a QC organization. An organizational chart shall be developed to show all QC personnel, their authority, and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all QC staff by name and function, and shall indicate the total staff required to implement all elements of the CQCP, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the CQCP, the personnel assigned shall be subject to the qualification requirements of paragraphs 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The QC organization shall, as a minimum, consist of the following personnel:

**a. Program Administrator.** The Contractor Quality Control Program Administrator (CQCPA) must be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA must have a minimum of five (5) years of experience in QC pavement construction with prior QC experience on a project of comparable size and scope as the contract.

Included in the five (5) years of paving/QC experience, the CQCPA must meet at least one of the following requirements:

- 1. Professional Engineer with one (1) year of airport paving experience.
- 2. Engineer-in-training with two (2) years of airport paving experience.
- 3. National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with three (3) years of airport paving experience.
- 4. An individual with four (4) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

The CQCPA must have full authority to institute any and all actions necessary for the successful implementation of the CQCP to ensure compliance with the contract plans and technical specifications. The CQCPA authority must include the ability to immediately stop production until materials and/or processes are in compliance with contract specifications. The CQCPA must report directly to a principal officer of the construction firm. The CQCPA may supervise the Quality Control Program on more than one project provided that person can be at the job site within two (2) hours after being notified of a problem.

**b. QC technicians.** A sufficient number of QC technicians necessary to adequately implement the CQCP must be provided. These personnel must be either Engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II in Civil Engineering Technology or higher, and shall have a minimum of two (2) years of experience in their area of expertise.

The QC technicians must report directly to the CQCPA and shall perform the following functions:

- 1. Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by paragraph 100-6.
- 2. Performance of all QC tests as required by the technical specifications and paragraph100-8.
- 3. Performance of tests for the RPR when required by the technical specifications.

Certification at an equivalent level of qualification and experience by a state or nationally recognized organization will be acceptable in lieu of NICET certification.

**c. Staffing levels.** The Contractor shall provide sufficient qualified QC personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The CQCP shall state where different technicians will be required for different work elements.

**100-4 Project progress schedule.** Critical QC activities must be shown on the project schedule as required by Section 80, paragraph 80-03, *Execution and Progress*.

**100-5 Submittals schedule.** The Contractor shall submit a detailed listing of all submittals (for example, mix designs, material certifications) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include as a minimum:

- 1. Specification item number
- 2. Item description
- 3. Description of submittal
- 4. Specification paragraph requiring submittal
- 5. Scheduled date of submittal

**100-6 Inspection requirements.** QC inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by paragraph 100-9.

Inspections shall be performed as needed to ensure continuing compliance with contract requirements until completion of the particular feature of work. Inspections shall include the following minimum requirements:

**a.** During plant operation for material production, QC test results and periodic inspections shall be used to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment used in proportioning and mixing shall be inspected to ensure its proper operating condition. The CQCP shall detail how these and other QC functions will be accomplished and used.

**b.** During field operations, QC test results and periodic inspections shall be used to ensure the quality of all materials and workmanship. All equipment used in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The CQCP shall document how these and other QC functions will be accomplished and used.

## 100-7 Contractor QC testing facility.

**a.** For projects that include Item P-401, Item P-403, and Item P-404, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM D3666, *Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials*:

- 8.1.3 Equipment Calibration and Checks;
- 8.1.9 Equipment Calibration, Standardization, and Check Records;
- 8.1.12 Test Methods and Procedures

**b.** For projects that include P-501, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM C1077, Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation:

- 7 Test Methods and Procedures
- 8 Facilities, Equipment, and Supplemental Procedures

**100-8 QC testing plan.** As a part of the overall CQCP, the Contractor shall implement a QC testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification Item, as well as any additional QC tests that the Contractor deems necessary to adequately control production and/or construction processes.

The QC testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

- **a.** Specification item number (e.g., P-401)
- **b.** Item description (e.g., Hot Mix Asphalt Pavements)
- **c.** Test type (e.g., gradation, grade, asphalt content)
**d.** Test standard (e.g., ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)

**e.** Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated)

**f.** Responsibility (e.g., plant technician)

g. Control requirements (e.g., target, permissible deviations)

The QC testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with ASTM D3665. The RPR shall be provided the opportunity to witness QC sampling and testing.

All QC test results shall be documented by the Contractor as required by paragraph 100-9.

**100-9 Documentation.** The Contractor shall maintain current QC records of all inspections and tests performed. These records shall include factual evidence that the required QC inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the RPR daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCPA.

Contractor QC records required for the contract shall include, but are not necessarily limited to, the following records:

**a. Daily inspection reports.** Each Contractor QC technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These technician's daily reports shall provide factual evidence that continuous QC inspections have been performed and shall, as a minimum, include the following:

- 1. Technical specification item number and description
- 2. Compliance with approved submittals
- 3. Proper storage of materials and equipment
- 4. Proper operation of all equipment
- 5. Adherence to plans and technical specifications
- 6. Summary of any necessary corrective actions
- 7. Safety inspection.
- 8. Photographs and/or video

The daily inspection reports shall identify all QC inspections and QC tests conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible QC technician and the CQCPA. The RPR shall be provided at least one copy of each daily inspection report on the work day following the day of record. When QC inspection and test results are recorded and transmitted electronically, the results must be archived.

**b. Daily test reports.** The Contractor shall be responsible for establishing a system that will record all QC test results. Daily test reports shall document the following information:

- 1. Technical specification item number and description
- 2. Test designation
- 3. Location
- 4. Date of test
- 5. Control requirements
- 6. Test results
- 7. Causes for rejection
- 8. Recommended remedial actions
- 9. Retests

Test results from each day's work period shall be submitted to the RPR prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical QC charts. When QC daily test results are recorded and transmitted electronically, the results must be archived.

**a.** Corrective action requirements. The CQCP shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the CQCP as a whole, and for individual items of work contained in the technical specifications.

The CQCP shall detail how the results of QC inspections and tests will be used for determining the need for corrective action and shall contain clear rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and use statistical QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.

**b. Inspection and/or observations by the RPR.** All items of material and equipment are subject to inspection and/or observation by the RPR at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate

QC system in conformance with the requirements detailed here and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to inspection and/or observation by the RPR at the site for the same purpose.

Inspection and/or observations by the RPR does not relieve the Contractor of performing QC inspections of either on-site or off-site Contractor's or subcontractor's work.

#### c. Noncompliance.

i. The Resident Project Representative (RPR) will provide written notice to the Contractor of any noncompliance with their CQCP. After receipt of such notice, the Contractor must take corrective action.

- ii. When QC activities do not comply with either the CQCP or the contract provisions or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective actions have been taken after notification of non-compliance, the RPR will recommend the Owner take the following actions:
  - 1. Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or
  - 2. Order the Contractor to stop operations until appropriate corrective actions are taken.

#### REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. National Institute for Certification in Engineering Technologies (NICET) ASTM International (ASTM)

ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

## END OF ITEM C-100

#### Item C-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control

#### DESCRIPTION

**102-1.** This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

Temporary erosion control shall be in accordance with the approved erosion control plan; the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2, *Operational Safety on Airports During Construction*. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be designed, installed and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

#### MATERIALS

**102-2.1 Grass.** Grass that will not compete with the grasses sown later for permanent cover per Item T-901shall be a quick-growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover. Selected grass species shall not create a wildlife attractant.

**102-2.2 Mulches.** Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials per Item T-908. Mulches shall not create a wildlife attractant.

**102-2.3 Fertilizer.** Fertilizer shall be a standard commercial grade and shall conform to all federal and state regulations and to the standards of the Association of Official Agricultural Chemists.

**102-2.4 Slope drains.** Slope drains may be constructed of pipe, fiber mats, rubble, concrete, asphalt, or other materials that will adequately control erosion.

**102-2.5 Silt fence.** Silt fence shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life. Silt fence shall meet the requirements of ASTM D6461.

102-2.6 Other. All other materials shall meet commercial grade standards and shall be approved by

the RPR before being incorporated into the project.

#### **CONSTRUCTION REQUIREMENTS**

**102-3.1 General.** In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

The RPR shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

**102-3.2 Schedule.** Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.

**102-3.3 Construction details.** The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching, and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the RPR.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the RPR. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

**102-3.4 Installation, maintenance and removal of silt fence.** Silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be set no more than 10 feet (3 m) on center. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the RPR.

#### REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5200-33 *Hazardous Wildlife Attractants on or Near Airports* 

AC 150/5370-2 Operational Safety on Airports During Construction

ASTM International (ASTM)

ASTM D6461 Standard Specification for Silt Fence Materials

United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

#### END OF ITEM C-102

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#### **Item C-105 Mobilization**

**105-1 Description.** This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project.

**105-2 Mobilization limit.** Mobilization shall be limited to 5 percent of the total project cost when detailed scheduled of values is submitted to the owner for review and approval.

**105-3 Posted notices.** Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

**105-4 Engineer/RPR field office.** The Contractor shall provide dedicated space for the use of the field RPR and inspectors, as a field office for the duration of the project. This space shall be located conveniently near the construction and shall be separate from any space used by the Contractor. The Contractor shall furnish water, sanitary facilities, heat, air conditioning, and electricity in accordance with local building codes.

#### REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

United States Department of Labor, Wage and Hour Division (WHD)

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

#### END OF ITEM C-105

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## SECTION 4 FEDERAL REQUIREMENTS FOR AIRPORT IMPROVEMENT PROGRAM (AIP) CONTRACTS

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## Federal Provisions for Airport Improvement Program (AIP) Contracts

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## AIP CONTRACT PROVISIONS A

### 1 GENERAL

The contractor (including all subcontractors) agrees to insert the following Federal contract provisions in each lower tier contract(s) (e.g. subcontract or sub-agreement) and to incorporate the applicable requirements of these contract provisions by reference for work done under any purchase orders, rental agreements and other agreements for supplies or services. The contractor also agrees to be responsible for compliance with these contract provisions by any subcontractor, lower-tier subcontractor or service provider.

For the Equal Employment Opportunity (EEO) clause, the term **applicant** means an applicant for employment (whether or not the phrase, *for employment*, follows the word applicant or applicants).

For all other clauses, the term **applicant** means a bidder, offeror, or proposer for a contract.

#### A2 ACCESS TO RECORDS AND REPORTS

The Contractor must maintain an acceptable cost accounting system. The Contractor agrees to provide the Owner, the Federal Aviation Administration and the Comptroller General of the United States or any of their duly authorized representatives access to any books, documents, papers and records of the Contractor which are directly pertinent to the specific contract for the purpose of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three years after final payment is made and all pending matters are closed.

## A3 AFFIRMATIVE ACTION REQUIREMENT (Contracts Exceeding \$10,000)

- 1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
- 2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

#### Timetables

Goals for minority participation for each trade:	9.72%
Goals for female participation in each trade:	6.9%

These goals are applicable to all of the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a) and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

- 3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs (OFCCP) within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.
- 4. As used in this notice and in the contract resulting from this solicitation, the "covered area" is Maryland, Washington County, Hagerstown.

## A4 BREACH OF CONTRACT TERMS (Contracts Exceeding \$150,000)

Any violation or breach of terms of this contract on the part of the Contractor or its subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement.

Owner will provide Contractor written notice that describes the nature of the breach and corrective actions the Contractor must undertake in order to avoid termination of the contract. Owner reserves the right to withhold payments to Contractor until such time the Contractor corrects the breach or the Owner elects to terminate the contract. The Owner's notice will identify a specific date by which the Contractor must correct the breach. Owner may proceed with termination of

the contract if the Contractor fails to correct the breach by the deadline indicated in the Owner's notice.

The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder are in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

## A 5 BUY AMERICAN PREFERENCE

The Contractor agrees to comply with 49 USC § 50101, which provides that Federal funds may not be obligated unless all steel and manufactured goods used in AIP funded projects are produced in the United States, unless the Federal Aviation Administration has issued a waiver for the product; the product is listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

A bidder or offeror must complete and submit the Buy American certification (s) included herein with their bid or offer. The Owner will reject as nonresponsive any bid or offer that does not include the completed Certificate of Buy American Compliance.

# A5.1 Certificate of Buy American Compliance for Total Facility (Buildings Such as Terminals)

#### **Certificate of Buy American Compliance for Total Facility**

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with its proposal. The bidder or offeror must indicate how it intends to comply with 49 USC § 50101 by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e. not both) by inserting a checkmark ( $\checkmark$ ) or the letter "X".

□ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101 by:

- a) Only installing steel and manufactured products produced in the United States; or
- b) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
- c) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

- To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
- To faithfully comply with providing U.S. domestic products.

- To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- □ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:
  - a) To the submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that supports the type of waiver being requested.
  - b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
  - c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
  - d) To furnish U.S. domestic product for any waiver request that the FAA rejects.
  - e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

#### **Required Documentation**

**Type 3 Waiver** – The cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the "facility". The required documentation for a Type 3 waiver is:

- a) Listing of all manufactured products that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
- b) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
- c) Percentage of non-domestic component and subcomponent cost as compared to total "facility" component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

**Type 4 Waiver** – Total cost of project using U.S. domestic source product exceeds the total project cost using non-domestic product by 25 percent. The required documentation for a Type 4 of waiver is:

- a) Detailed cost information for total project using U.S. domestic product
- b) Detailed cost information for total project using non-domestic product

**False Statements**: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Signature

Company Name

Title

## A5 2 Certificate of Buy American Compliance – Manufactured Product (Equipment Acquisition)

## **Certificate of Buy American Compliance for Manufactured Products**

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101 by selecting one on the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (not both) by inserting a checkmark ( $\checkmark$ ) or the letter "X".

□ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101 by:

- a) Only installing steel and manufactured products produced in the United States;
- b) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
- c) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

- 1. To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
- 2. To faithfully comply with providing U.S. domestic product.
- 3. To furnish U.S. domestic product for any waiver request that the FAA rejects
- 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- □ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

- 1. To the submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that supports the type of waiver being requested.
- 2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination may result in rejection of the proposal.
- 3. To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
- 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

#### **Required Documentation**

**Type 3 Waiver** – The cost of the item components and subcomponents produced in the United States is more that 60 percent of the cost of all components and subcomponents of the "item". The required documentation for a Type 3 waiver is:

- a) Listing of all product components and subcomponents that are not comprised of 100 percent U.S. domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
- b) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
- c) Percentage of non-domestic component and subcomponent cost as compared to total "item" component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

**Type 4 Waiver** – Total cost of project using U.S. domestic source product exceeds the total project cost using non-domestic product by 25 percent. The required documentation for a Type 4 of waiver is:

- a) Detailed cost information for total project using U.S. domestic product
- b) Detailed cost information for total project using non-domestic product

**False Statements**: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date

Signature

Company Name

Title

## A6 CIVIL RIGHTS - GENERAL

The Contractor agrees to comply with pertinent statutes, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract. This provision is in addition to that required by Title VI of the Civil Rights Act of 1964.

## A7 CIVIL RIGHTS – TITLE VIASSURANCE

#### A 7.1 Title VI Solicitation Notice

**The Board of County Commissioners of Washington County**, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 USC §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders or offerors that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

#### A 7.2 Compliance with Non-Discrimination Requirements

During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor"), agrees as follows:

- 1. **Compliance with Regulations:** The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
- 2. Nondiscrimination: The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.
- 3. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations, either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the contractor's obligations under this contract and the

Non-discrimination Acts and Authorities on the grounds of race, color, or national origin.

- 4. **Information and Reports:** The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts and Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.
- 5. **Sanctions for Noncompliance:** In the event of a Contractor's noncompliance with the non-discrimination provisions of this contract, the sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:
  - a. Withholding payments to the Contractor under the contract until the Contractor complies; and/or
  - b. Cancelling, terminating, or suspending a contract, in whole or in part.
- 6. **Incorporation of Provisions:** The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the sponsor to enter into any litigation to protect the interests of the sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

## 7.3 Title VI List of Pertinent Non-Discrimination Acts and Authorities

During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 USC § 2000d *et seq.*, 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);
- 49 CFR part 21 (Non-discrimination in Federally-assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 USC § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

- Section 504 of the Rehabilitation Act of 1973 (29 USC § 794 *et seq.*), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27;
- The Age Discrimination Act of 1975, as amended (42 USC § 6101 *et seq.*) (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982 (49 USC § 471, Section 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987 (PL 100-209) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 USC §§ 12131 12189) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;
- The Federal Aviation Administration's Nondiscrimination statute (49 USC § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 USC 1681 et seq).

## A8 CLEAN AIR AND WATER POLLUTION CONTROL (Contracts Exceeding \$150,000)

Contractor agrees to comply with all applicable standards, orders, and regulations issued pursuant to the Clean Air Act (42 USC § 740-7671q) and the Federal Water Pollution Control Act as amended (33 USC § 1251-1387). The Contractor agrees to report any violation to the Owner immediately upon discovery. The Owner assumes responsibility for notifying the Environmental Protection Agency (EPA) and the Federal Aviation Administration.

Contractor must include this requirement in all subcontracts that exceeds \$150,000.

## A9 CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS (Contracts Exceeding \$100,000)

#### 1. Overtime Requirements.

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic, including watchmen and guards, in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

#### 2. Violation; Liability for Unpaid Wages; Liquidated Damages.

In the event of any violation of the clause set forth in paragraph (1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this clause, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this clause.

#### 3. Withholding for Unpaid Wages and Liquidated Damages.

The Federal Aviation Administration (FAA) or the Owner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this clause.

#### 4. Subcontractors.

The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this clause.

## A10 COPELAND "ANTI-KICKBACK" ACT (Contracts Exceeding \$2,000)

Contractor must comply with the requirements of the Copeland "Anti-Kickback" Act (18 USC 874 and 40 USC 3145), as supplemented by Department of Labor regulation 29 CFR part 3. Contractor and subcontractors are prohibited from inducing, by any means, any person employed on the project to give up any part of the compensation to which the employee is entitled. The Contractor and each Subcontractor must submit to the Owner, a weekly statement on the wages paid to each employee performing on covered work during the prior week. Owner must report any violations of the Act to the Federal Aviation Administration.

## A11 DAVIS-BACON REQUIREMENTS (Contracts Exceeding \$2,000)

#### 1. Minimum Wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalent thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided* that the employer's payroll records accurately set forth the time spent in each classification and wage rates conformed under (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can easily be seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination;

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the Contractor, the laborers, or mechanics to be employed in the classification, or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii) (B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably

anticipated in providing bona fide fringe benefits under a plan or program: *Provided* that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account asset for the meeting of obligations under the plan or program.

#### 2. Withholding.

The Federal Aviation Administration or the sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of work, all or part of the wages required by the contract, the Federal Aviation Administration may, after written notice to the Contractor, Sponsor, Applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

#### 3. Payrolls and Basic Records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records that show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and that show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at www.dol.gov/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker and shall provide them upon request to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit them to the applicant, sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, Sponsor, or Owner).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- The payroll for the payroll period contains the information required to be provided under 29 CFR § 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR § 5.5 (a)(3)(i), and that such information is correct and complete;
- (2) Each laborer and mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations 29 CFR Part 3;

(3) Each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The Contractor or subcontractor shall make the records required under paragraph (3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the sponsor, the Federal Aviation Administration, or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, Sponsor, applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

## 4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship

program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination that provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal Employment Opportunity. The utilization of apprentices, trainees, and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

#### 5. Compliance with Copeland Act Requirements.

The Contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

#### 6. Subcontracts.

The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR Part 5.5(a)(1) through (10) and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

### 7. Contract Termination: Debarment.

A breach of the contract clauses in paragraph 1 through 10 of this section may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

## 8. Compliance with Davis-Bacon and Related Act Requirements.

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

## 9. Disputes Concerning Labor Standards.

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general dispute's clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

## 10. Certification of Eligibility.

(i) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 USC 1001.

## A12 DEBARMENT AND SUSPENSION (Contracts Exceeding \$25,000)

#### A12.1 Certification of Offeror/Bidder Regarding Debarment

By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

## A12.2 Certification of Lower Tier Contractors Regarding Debarment

The successful bidder, by administering each lower tier subcontract that exceeds \$25,000 as a "covered transaction", must verify each lower tier participant of a "covered transaction" under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. The successful bidder will accomplish this by:

- 1. Checking the System for Award Management at website: http://www.sam.gov.
- 2. Collecting a certification statement similar to the Certification of Offeror /Bidder Regarding Debarment, above.
- 3. Inserting a clause or condition in the covered transaction with the lower tier contract.

If the Federal Aviation Administration later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

#### A13 DISADVANTAGED BUSINESS ENTERPRISE

#### A13.1 Information Submitted as A Matter of Bidder Responsiveness

The Owner's award of this contract is conditioned upon Bidder or Offeror satisfying the good faith effort requirements of 49 CFR §26.53.

As a condition of bid responsiveness, the Bidder or Offeror must submit the following information with its proposal on the forms provided herein:

- 1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
- 2) A description of the work that each DBE firm will perform;
- 3) The dollar amount of the participation of each DBE firm listed under (1)
- 4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal; and

5) If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26.

## A13.2 Information Submitted as A Matter of Bidder Responsibility

The Owner's award of this contract is conditioned upon Bidder or Offeror satisfying the good faith effort requirements of 49 CFR §26.53.

The successful Bidder or Offeror must provide written confirmation of participation from each of the DBE firms the Bidder or Offeror lists in its commitment within five days after bid opening.

- 1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
- 2) A description of the work that each DBE firm will perform;
- 3) The dollar amount of the participation of each DBE firm listed under (1)
- 4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal; and
- 5) If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26.

## A13.3 Race/Gender Neutral Means

The requirements of 49 CFR part 26 apply to this contract. It is the policy of The Board of County Commissioners of Washington County to practice nondiscrimination based on race, color, sex, or national origin in the award or performance of this contract. The Owner encourages participation by all firms qualifying under this solicitation regardless of business size or ownership.

## A13.4 Projects Covered by A DBE Program

## DISADVANTAGED BUSINESS ENTERPRISES

#### Contract Assurance (§ 26.13) -

The Contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of Department of Transportation-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the Owner deems appropriate, which may include, but is not limited to:

- 1) Withholding monthly progress payments;
- 2) Assessing sanctions;
- 3) Liquidated damages; and/or
- 4) Disqualifying the Contractor from future bidding as non-responsible.

**Prompt Payment** (§26.29) – The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 30 days from the receipt of each payment the prime contractor receives from The Board of County Commissioners of Washington County. The prime contractor agrees further to return retainage payments to each subcontractor within 30 days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of The Board of County Commissioners of Washington County. This clause applies to both DBE and non-DBE subcontractors.

## A14 DISTRACTED DRIVING (Contracts Exceeding \$3,500)

## A14.1 Texting When Driving

In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving", (10/1/2009) and DOT Order 3902.10, "Text Messaging While Driving", (12/30/2009), the Federal Aviation Administration encourages recipients of Federal grant funds to adopt and enforce safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or subgrant.

In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decrease crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work activities associated with the project. The Contractor must include the substance of this clause in all sub-tier contracts exceeding \$3,500 that involve driving a motor vehicle in performance of work activities associated with the project.

## A 1 5 ENERGY CONSERVATION REQUIREMENTS

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to energy efficiency as contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 USC 6201*et seq*).

## A 1 6 EQUAL EMPLOYEMENT OPPORTUNITY (EEO) (Contracts Exceeding \$10,000)

## A16.1 Equal Opportunity Clause

During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action

to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identify, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff, or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.

(3) The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided bylaw.

(7) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided, however*, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such

direction by the administering agency the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

#### A16.2 Standard Federal Equal Employment Opportunity Construction Contract Specifications

- 1. As used in these specifications:
  - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
  - b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;
  - c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;
  - d. "Minority" includes:

(1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);

(3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(4) American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR part 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors shall be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in a geographical area where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the Contractor has a collective bargaining agreement to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees shall be employed by the Contractor during the training period and the Contractor shall have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees shall be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community
organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or female sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions, including specific review of these items, with onsite supervisory personnel such superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students; and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR part 60-3.

1. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative action obligations (7a through 7p). The efforts of a contractor association, joint contractor union, contractor community, or other similar groups of which the Contractor is a member and participant may be asserted as fulfilling any one or more of its obligations under 7a through 7p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to

documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, if the particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally), the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized.

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR part 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee, the name, address, telephone number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program)

## A17 FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part-time workers.

The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

## A18 LOBBYING AND INFLUENCING FEDERAL EMPLOYEES (Contracts Exceeding \$100,000)

## A18.1 Certification Regarding Lobbying

The Bidder or Offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, subgrants, and

contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

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

## A 19 PROHIBITION of SEGREGATED FACILITIES

(a) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Employment Opportunity clause in this contract.

(b) "Segregated facilities," as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

(c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Employment Opportunity clause of this contract.

## A 20 OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

All contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 CFR Part 1910 with the same force and effect as if given in full text. The employer must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The employer retains full responsibility to monitor its compliance and their subcontractor's compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (20 CFR Part 1910). The employer must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

## A21 PROCUREMENT OF RECOVERED MATERIALS (Contracts Exceeding \$10,000)

Contractor and subcontractor agree to comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part 247. In the performance of this contract and to the extent practicable, the Contractor and subcontractors are to use products containing the highest percentage of recovered materials for items designated by the Environmental Protection Agency (EPA) under 40 CFR Part 247 whenever:

- 1) The contract requires procurement of \$10,000 or more of a designated item during the fiscal year; or
- 2) The contractor has procured \$10,000 or more of a designated item using Federal funding during the previous fiscal year.

The list of EPA-designated items is available at www.epa.gov/smm/comprehensive-procurement-guidelines-construction-products.

Section 6002(c) establishes exceptions to the preference for recovery of EPA-designated products if the contractor can demonstrate the item is:

- a) Not reasonably available within a timeframe providing for compliance with the contract performance schedule;
- b) Fails to meet reasonable contract performance requirements; or
- c) Is only available at an unreasonable price.

## A22 SEISMIC SAFETY

The Contractor agrees to ensure that all work performed under this contract, including work performed by subcontractors, conforms to a building code standard that provides a level of seismic safety substantially equivalent to standards established by the National Earthquake Hazards Reduction Program (NEHRP). Local building codes that model their code after the current version of the International Building Code (IBC) meet the NEHRP equivalency level for seismic safety.

## A23 TAX DELINQUENCY AND FELONY CONVICTIONS

## A23.1 Certification of Offeror/Bidder Regarding Tax Delinquency and Felony Convictions

The applicant must complete the following two certification statements. The applicant must indicate its current status as it relates to tax delinquency and felony conviction by inserting a checkmark ( $\checkmark$ ) in the space following the applicable response. The applicant agrees that, if

awarded a contract resulting from this solicitation, it will incorporate this provision for certification in all lower tier subcontracts.

## Certifications

- 1) The applicant represents that it is  $(\checkmark)$  is not  $(\checkmark)$  a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.
- 2) The applicant represents that it is  $(\checkmark)$  is not  $(\checkmark)$  is not a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

### Note

If an applicant responds in the affirmative to either of the above representations, the applicant is ineligible to receive an award unless the sponsor has received notification from the agency suspension and debarment official (SDO) that the SDO has considered suspension or debarment and determined that further action is not required to protect the Government's interests. The applicant therefore must provide information to the owner about its tax liability or conviction to the Owner, who will then notify the FAA Airports District Office, which will then notify the agency's SDO to facilitate completion of the required considerations before award decisions are made.

## **Term Definitions**

**Felony conviction:** Felony conviction means a conviction within the preceding twenty-four

(24) months of a felony criminal violation under any Federal law and includes conviction of an offense defined in a section of the U.S. code that specifically classifies the offense as a felony and conviction of an offense that is classified as a felony under 18 U.S.C. § 3559.

**Tax Delinquency**: A tax delinquency is any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

## A24 TERMINATION OF CONTRACT (Contracts Exceeding \$10,000)

## A24.1 Termination for Convenience

The Owner may terminate this contract in whole or in part at any time by providing written notice to the Contractor. Such action may be without cause and without prejudice to any other right or remedy of Owner. Upon receipt of a written notice of termination, except as explicitly directed by

the Owner, the Contractor shall immediately proceed with the following obligations regardless of any delay in determining or adjusting amounts due under this clause:

- 1. Contractor must immediately discontinue work as specified in the written notice.
- 2. Terminate all subcontracts to the extent they relate to the work terminated under the notice.
- 3. Discontinue orders for materials and services except as directed by the written notice.
- 4. Deliver to the Owner all fabricated and partially fabricated parts, completed and partially completed work, supplies, equipment and materials acquired prior to termination of the work, and as directed in the written notice.
- 5. Complete performance of the work not terminated by the notice.
- 6. Take action as directed by the Owner to protect and preserve property and work related to this contract that Owner will take possession.

Owner agrees to pay Contractor for:

- 1) completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination;
- documented expenses sustained prior to the effective date of termination in performing work and furnishing labor, materials, or equipment as required by the contract documents in connection with uncompleted work;
- 3) reasonable and substantiated claims, costs, and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and
- 4) reasonable and substantiated expenses to the Contractor directly attributable to Owner's termination action.

Owner will not pay Contractor for loss of anticipated profits or revenue or other economic loss arising out of or resulting from the Owner's termination action.

The rights and remedies this clause provides are in addition to any other rights and remedies provided by law or under this contract.

## A24.2 Terminal for Default (Construction)

Section 80-09 of FAA Advisory Circular 150/5370-10 establishes conditions, rights, and remedies associated with Owner termination of this contract due to default of the Contractor.

## A 2 4.3 Termination for Default (Equipment)

The Owner may, by written notice of default to the Contractor, terminate all or part of this Contract if the Contractor:

1. Fails to commence the Work under the Contract within the time specified in the Notice- to-Proceed;

- 2. Fails to make adequate progress as to endanger performance of this Contract in accordance with its terms;
- 3. Fails to make delivery of the equipment within the time specified in the Contract, including any Owner approved extensions;
- 4. Fails to comply with material provisions of the Contract;
- 5. Submits certifications made under the Contract and as part of their proposal that include false or fraudulent statements; or
- 6. Becomes insolvent or declares bankruptcy.

If one or more of the stated events occur, the Owner will give notice in writing to the Contractor and Surety of its intent to terminate the contract for cause. At the Owner's discretion, the notice may allow the Contractor and Surety an opportunity to cure the breach or default.

If within [10] days of the receipt of notice, the Contractor or Surety fails to remedy the breach or default to the satisfaction of the Owner, the Owner has authority to acquire equipment by other procurement action. The Contractor will be liable to the Owner for any excess costs the Owner incurs for acquiring such similar equipment.

Payment for completed equipment delivered to and accepted by the Owner shall be at the Contract price. The Owner may withhold from amounts otherwise due the Contractor for such completed equipment, such sum as the Owner determines to be necessary to protect the Owner against loss because of Contractor default.

Owner will not terminate the Contractor's right to proceed with the Work under this clause if the delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such acceptable causes include: acts of God, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, and severe weather events that substantially exceed normal conditions for the location.

If, after termination of the Contractor's right to proceed, the Owner determines that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the Owner issued the termination for the convenience the Owner.

The rights and remedies of the Owner in this clause are in addition to any other rights and remedies provided by law or under this contract.

## A 2 5 TRADE RESTRICTION CERTIFICATION

By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror -

- is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (USTR);
- 2) has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and
- 3) has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18 USC Section 1001.

The Offeror/Contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractors provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to an Offeror or subcontractor:

- 1) who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR or
- 2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list or
- 3) who incorporates in the public works project any product of a foreign country on such USTR list.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in all lower tier subcontracts. The Contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country included on the list of countries that discriminate against U.S. firms as published by USTR, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration (FAA) may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

## A26 VETERAN'S PREFERENCE

In the employment of labor (excluding executive, administrative, and supervisory positions), the Contractor and all sub-tier contractors must give preference to covered veterans as defined within Title 49 United States Code Section 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 USC 632) owned and controlled by disabled veterans. This preference only applies when there are covered veterans readily available and qualified to perform the work to which the employment relates.

## **SECTION 5 TECHNICAL SPECIFICATIONS**

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#### SECTION 004373 - PROPOSED SCHEDULE OF VALUES FORM

#### 1.1 BID FORM SUPPLEMENT

A. A completed Proposed Schedule of Values form is required to be attached to the Bid Form.

#### 1.2 PROPOSED SCHEDULE OF VALUES FORM

- A. Proposed Schedule of Values Form: Provide a breakdown of the bid amount, including alternates, in enough detail to facilitate continued evaluation of bid. Coordinate with the Project Manual table of contents. Provide multiple line items for principal material and subcontract amounts in excess of five percent of the Contract Sum.
- B. Arrange schedule of values using AIA Document G703-1992.
  - 1. Copies of AIA standard forms may be obtained from the American Institute of Architects; <u>https://www.aiacontracts.org/library</u>; (800) 942-7732.

END OF DOCUMENT 004373

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#### SECTION 01 10 00 SUMMARY

#### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings, general provisions of the Contract, including FAA General Provisions, Washington County General Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Work covered by the Contract Documents.
  - 2. Type of the Contract.
  - 3. Work phases.
  - 4. Work under other contracts.
  - 5. Products ordered in advance.
  - 6. Owner-furnished products.
  - 7. Use of premises.
  - 8. Owner's occupancy requirements.
  - 9. Specification formats and conventions.
  - 10. Project Team Qualifications
  - 11. Utility Permits & Connections
  - 12. Electronic Drawing Files
- B. Related Sections include the following:
  - 1. Section 01 50 00 Temporary Facilities and Controls for limitations and procedures governing temporary use of Owner's facilities.

#### 1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification:
  - 1. Project Name: Hagerstown Regional Airport Terminal Building Expansion A.I.P. No. 3-24-0019-059-2018 (DESIGN)
  - 2. Project Location: Terminal Building Expansion, 18434 Showalter Road, Hagerstown, Maryland, 21742
  - 3. Building Occupancy Classification: Group A-3 Assembly & Group B Business
  - 4. Number of Stories: One
  - 5. Existing Floor Area: 18,360 sf
  - 6. New Floor Area: 5,550 sf
  - 7. Total Floor Area: 23,910 gsf
  - 8. Building Construction Type: Type IIB Noncombustible/ Unprotected

B.	Architect:	Bushey Feight Morin
		473 North Potomac Street
		Hagerstown, Maryland 21740

- C. Owner Representative: Airport Design Consultants, Inc. 6031 University Blvd., Suite #330 Ellicott City, MD 21043
- D. Project Description: The Work consists of the following
  - 1. This project includes selective demolition to approximately 2,324 sf roof area with a building addition of approximately 5,554 sf. The combined additional floor space with a new roof over the demolished section totals 7,878 sf of new

building roof cover. An additional roof over a 22' x 48' vehicle canopy equates to 1,056 sf.

The building addition provides a larger Hold Room with a capacity of approximately 300 occupants. The additional Hold Room area provides new amenities including new public toilets, bar and service counters, video displays and convenient charging stations.

An expanded TSA area of approximately 1,775 sf is relocated to provide space for passenger security processing within the expanded area.

The entire remaining areas of over 16,000 sf will require complete renovation for new floor, walls, and ceiling finishes with upgrades to electrical, mechanical, plumbing and sprinkler systems.

Project includes a base bid and six (6) Add Alternates as listed below:

- 1) Passenger Boarding Bridge and Interior Ramp
- 2) Main Terminal Flooring Replacement
- 3) Airline/Concession/Rental Car Counters
- 4) Main Terminal Paint and Wall Finishes
- 5) Exterior Canopies
- 6) New Generator

#### 2. Design Criteria

- a. Applicable Building Codes and Regulations
  - 1) 2015 IBC International Building Code
  - 2) 2015 IMC International Mechanical Code
  - 3) 2015 IPC International plumbing Code
  - 4) 2014 NEC National Electric Code
  - 5) 2015 NFPA 101 Life Safety Code
  - 6) Maryland Accessibility Code ADAAG Fire Protection:
  - 7) Supervised automatic sprinkler system
  - 8) Addressable fire alarm system

#### 1.4 TYPE OF CONTRACT

A. Project will be constructed under a general construction contract.

#### 1.5 WORK PHASES

- A. The Work shall be conducted in nine (9) phases unless otherwise approved. See the drawings for complete phasing information. Prior to submitting a schedule, the Contractor shall schedule a meeting to review phasing plans and discuss work flow with the Owner, Architect, and RPR.
- B. Before commencing work, contractor shall submit a schedule showing the sequence, commencement and completion dates, and move-out and -in dates of Owner's personnel for all phases of the Work. Provide copies for approval to the Architect and RPR prior to mobilization.
- C. Project Phasing Narrative:
  - 1. The work of this project is designed and illustrated in numerous phases in order to maintain airport operations at all times. It is imperative that the contractor coordinate closely with the Owner's Resident Project Representative (RPR) to maintain daily flight operations and the published flight scheduled for the two airlines; Allegiant Air and Southern Airways Express. The phasing plans and narrative are intended to provide and overall guide for the construction of the project in its entirety.

Flight schedules for these two airline carriers will be published and provide to the contractors for contractor schedule. Currently Allegiant air is using Air Bus 320's and flies two (2) flights weekly on Mondays and Fridays and will add a mid-week flight during the summer of 2019. Southern Airways Express operates daily flights to BWI, Dulles, and Reagan. The operations of these airlines cannot be interrupted, and construction activities must be scheduled around the flight schedules. Flights schedules may change at the discretion of the airlines and Airport Administration.

Passenger boarding routes and arriving passengers will utilize designated boarding paths through TSA security to the current Hold Room, and temporary Hold Rooms designated in the phasing diagrams. The structural design of the new additions has taken the construction phasing into consideration, and Phase

1 is designed to provide the contractor with a space to construct the first structural component while maintaining the current TSA equipment operations and the current Hold Room.

Moving the TSA security equipment can only be done by specialty contractors employed through the Transportation Security Administration.

In consideration of the restrictions placed on the Hagerstown Regional Airport to comply with TSA operations, the equipment will only be relocated during the final phases of construction currently identified under Phase 7. Later phases identified are for interior alterations to the Public Toilet Rooms, Ticketing Offices, Airline Check-In casework, Car Rental casework, and floor, wall, and ceiling finishes, terminal signage and monitors.

a. During construction the Contractor shall be required to protect the TSA security equipment from any dust and debris. Protection must be removed, and equipment made operational when required for airport business.

A total of nine (9) phases are illustrated to accomplish the alterations and additions and the contractor is ultimately responsible to complete the work of the entire project under the contractor means and methods for construction. The contractor will be required to submit a construction schedule including the phasing of the project. Construction activities currently identified in specific phases shall be permitted to be completed in earlier phases when approved in advance by the airport authority and the RPR.

- 2. General Outline of Phases:
  - i. <u>Phase 1 Operations</u>:
    - 1) Phase 1 construction activities shall include all activities necessary to complete a warm shell space with temporary floor, wall, and ceiling finishes and equipment to provide a comfortable temporary passenger holding space while other construction phases are completed.
    - 2) Phase 1 construction includes the following construction divisions of work;
      - a) Division 1 Requirements.
      - b) Division 2 Site Construction;
        - i. Civil demolition including the removal and relocation of storm drainage, underground utilities, electrical systems and lighting, and all others identified on the Civil plans.
        - ii. Building excavation, minor demolition for construction.
      - c) Division 3 Concrete: Footings, foundations, patching, etc....
      - d) Division 4 Masonry: Foundation walls, brick veneer,

etc....

- e) Division 5 Metals: Structural steel, roof deck, etc....
- f) Division 6 Wood and Plastics: Temporary construction.
- g) Division 7 Thermal and Moisture Protection: roof and insulation; others.
- h) Division 8 Openings: Windows, doors, hardware, others; selective demolition of existing windows to provide door opening.
- i) Division 9 Finishes: Temporary floors, walls, and ceiling finishes.
- j) Division 10 Specialties: as identified.
- k) Division 11 Equipment: as identified.
- 1) Division 21 Fire Suppression: Extension of existing system.
- m) Division 22 Plumbing:
  - i. Provide all underground rough-ins for later phases including toilet rooms and café plumbing.
  - ii. Temporary protection of floor openings to be provided under Division 6.
- n) Division 23 HVAC:
  - i. The roof top unit will be provided for this building addition with temporary air distribution system.
  - ii. The selective demolition of a wall heater.
- o) Division 25 Automation: Door controls for security.
- p) Division 26 Electrical: New electric room with new electric panels, equipment to support future phases and Phase 1 temporary conditions including lighting, outlets, and others as shown on the drawings.
- 3) Phase 1 in summary shall provide all divisions of work and the individual division sections of work specified for the completed space and for the temporary use and occupancy approved by the Washington County Division of Permitting and Inspection for the safe occupancy of the temporary Hold Room space.

#### Phase 2 Operations:

ii.

Passenger Flore - Phase 2 construction activities will continue with the current TSA equipment location and the normal operations and entry screening processes. The current Conference/Hold Room space will be modified to allow the movement of passengers to access the new temporary Hold Room with alterations completed in Phase 1 to remove a window and install a temporary door. Passengers will pass through the new door opening into the temporary Hold Room. The passengers will exit the temporary Hold Room through a door to the exterior and follow a new designated and protected route to board the aircraft.

The flow of arriving passengers will be directed back through the temporary holding room. Passenger luggage may be trucked to the front of the terminal building and received under the building overhand.

Major demolition of the existing Hold Room: Maintain portions of roof over TSA equipment area and Toilet Room.

Selective demolition to the existing Hold Room will require constructing temporary walls to isolate the shoring of remaining roof structure and the placement of shoring columns prior to demolition of the north side of the structure. The demolition of the structural steel installed in the 2005 building addition will require two (2) sub-phases to complete. An initial temporary barrier wall will be constructed with selective demolition of suspended ceiling and temporary wall constructed from floor to underside of deck. Shoring columns will be installed along with other structural elements to support the roof system.

In this phase the roof top mechanical unit will be removed and structural components north of the shoring line will be disassembled and removed from site. Two heavily reinforced brick veneer pilasters will also be demolished and removed from site.

Following the partial demolition of the roofing, roof deck, and structural steel, the remaining wall will be flashed for water tightness and exterior of wall finished in temporary metal siding. The interior of the space will be maintained to function as usable space and for access to the remaining two (2) single use Toilet Rooms.

TSA operations will be maintained during this phase with security maintenance for passenger use of the secured area Toilet Rooms.

iii. <u>Phase 3 Operations</u>:

Following the installation of the temporary construction wall, additional demolition of concrete floor slabs will be completed, and excavation completed to form and pour wall and column footings, piers, and foundation walls.

Structural steel, columns and tube trusses shall be installed on frame lines A.4, A.2, and B.4. Interior footings for frame line C.1 will require dust control walls for saw cutting of interior concrete floor slabs for the installation of tube column footings at C2.1 and 4.2, and column footing at C2.1 and 6.8. The installation of these columns will require dropping the columns in a pocket cut out at the ends of the remaining roof during this phase.

In order to install the foundation at C2.1 and 6.8 the south Toilet Rooms will be eliminated during this phase. Column line C2.1 will provide clearance north of the skylight and bottom of tube truss bearing of 14'- 8" will allow setting of truss over remaining roof.

The roof overbuild will be completed at the end of phase with the existing roof received wood block flute fillers and an overlayment of 3/4" fire retardant treated plywood. High temperature metal roofing underlayment will be installed prior to placing overbuild light gage steel trusses. New trusses will receive ceiling roof decking over exposed high bay trusses and plywood over light gage steel trusses on overbuild gable connection.

All door and window openings shall be installed, and all exterior finishes and flashings completed. The ramp will be constructed if alternate is accepted and railings installed.

Following the installation of valley flashing and new standard seam roofing installed over new and overbuild area, the remaining demolition can be completed. Remaining steel between B.7, B, and C.2 may be disassembled and removed from site. Temporary wall constructed in Phase 2 shall be removed.

All mechanical, electrical, plumbing, sprinklers, and specialties shall be installed and completed. Finishes to all walls, and ceiling to be completed. Flooring will not be required at this time.

iv.

#### Phase 4 Operations:

Construction of temporary wall and begin use of new Hold Room. After completing construction of the new Hold Room roof the remainder of the existing roof that is required to be demolished can be removed. With all mechanical, electrical, plumbing systems completed, tested, and approved, and all interior finishes completed, final approvals shall be granted by Washington County Permitting and Inspections with a temporary use and occupancy issue. The remaining temporary walls shall be removed with walls, floors, and ceiling repaired. The new Hold Room will be used by passengers to exit through the new exterior door for aircraft loading. A new temporary wall will be required for work to begin in the Phase 5 work area.

#### v. Phase 5 Operations:

Interior build out to the initial temporary room will be initiated and new plumbing systems for the new Public Toilet Rooms and Café area installed. Above ceiling mechanical, electrical, sprinkler, and fire alarm systems installed. New acoustical ceilings, lighting, sprinkler heads, air diffusers, and all systems specified installed. Doors shall be installed with hardware and floor, walls, and ceiling finishes completed. With acceptance by the Building Department, the new offices may be utilized with temporary partitions removed.

Two (2) new interior offices will be constructed adjacent to the new TSA office. The door to the new TSA Room shall be removed and wall constructed to separate TSA Lounge from Airport Offices.

#### vi. <u>Phase 6 Operations</u>:

Remaining Hold Room Toilet Rooms shall be removed, floors and walls patched, and new finishes installed. Temporary walls shall be removed following the completion of the work. The renovation of the existing office area can be completed during this phase.

A new entry door shall be installed in the current corner office and new security window installed. Above ceiling mechanical and electrical systems shall be installed with new ceilings, lighting and air diffusers. Build out of the TSA office and previous Hold Room can begin.

Display window between office and terminal lobby shall be removed and wall enclosed. Interior alterations to open office space shall be competed with ceilings removed to re-work ductwork. Install new acoustical ceilings, LED lighting and diffusers. Install new custom casework desk and work stations. Replace carpet with new carpet tiles.

#### vii. <u>Phase 7 Operations</u>:

Construction new temporary wall to create secure area around screening. Demolish any remaining storefront or separation walls around TSA screening area.

Specialty contractor to relocate TSA equipment to final location. New aluminum interior storefront to be installed following relocation of equipment. A roll-up door shall be installed to received passengers into TSA screening area. Remove temporary walls. Remove aluminum storefront walls at previous TSA Security Lounge.

Demolish walls and remove two (2) baggage conveyors from airline office and enlarge interior spaces. Ceilings shall be removed to rework and install new ductwork. New walls to be constructed and painted.

#### viii. <u>Phase 8 Operations</u>:

Renovate existing Toilet Rooms and install flooring at Hold Room.

Provide portable toilet facilities under canopy on east side to be accessed through automatic sliding doors on east side of terminal. Public Toilet Rooms in main terminal to be demolished and spaces totally re-finished with new toilet fixtures, floor and wall tile, linear solid surface lavatory, new toilet partitions and accessories, new acoustical ceiling and lighting.

 ix. <u>Phase 9 Operations – Main Terminal ADD Alternate Work</u>: Replace all ceramic tile flooring, paint ceiling and wall surfaces. Install new ticket counters with new custom casework and rework all under slab electrical and data/telephone conduits and conductors.

#### 1.6 WORK UNDER OTHER CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

#### 1.7 PRODUCTS ORDERED IN ADVANCE

A. Not used.

#### 1.8 OWNER-FURNISHED PRODUCTS

- A. Owner-Furnished Products:
  - 1. Furniture
  - 2. Office Equipment
  - 3. Work Stations/Systems Furniture
  - 4. IT Wiring

#### 1.9 USE OF PREMISES

- A. General: Contractor shall have use of premises for construction operations to the extent and limits as indicated on the Drawings and Specifications.
- B. Use of Site: Limit use of premises to Work in areas a s indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - 1. Owner Occupancy: Allow for Owner occupancy of Project site.
  - 2. Driveways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
    - c. Remove snow and ice from Project site immediately prior to resuming Work on Project Site.
- C. Use of Building: Maintain building in a weather tight condition throughout construction period when it has been 'dried in'. Repair all damage caused by construction operations. Protect building and its occupants during construction period. The Contractor shall secure said property and maintain a secure perimeter. Contractor

shall maintain the functionality of all building systems placed into operation unless the contract calls for other specified actions.

#### 1.10 WORK RESTRICTIONS

- A. On-Site Work Hours: Work shall be generally performed on site and inside the building during normal business working hours of 5 a.m. to 5 p.m., Monday through Friday, pending local noise ordinance restrictions, or as otherwise indicated;
  - 1. Weekend Hours: as negotiated with Owner's Representative.
  - 2. Early Morning Hours: as negotiated with Owner's Representative.
  - 3. Hours for Utility Shutdowns: as negotiated with Owner's Representative.
  - 4. See the Allegiant Airline schedule at the end of the section for anticipated flight schedule through August 2019. Contractor shall not impact airline operations at any time and shall coordinate site access and scheduled construction activities with the Owner's Representative.

#### 1.11 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Section Identification:
  - 1. The Specifications use Section numbers and titles to help cross- referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
  - 2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
  - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

#### 1.12 PROJECT TEAM QUALIFICATIONS

- A. Prior to start of construction, the Contractor shall submit resumes of the following personnel to the Owner/Resident Project Representative (RPR) for review and approval:
  - 1. Project Manager (Office)
  - 2. Senior Superintendent
  - 3. The following as required by the Contractor's approved schedule:
    - a. Superintendent Building Envelope
    - b. Superintendent Finishes
    - c. Superintendent/Foreman Civil, MEP, Fire Protection, Telecom and Security Systems
- B. The resumes must demonstrate that the personnel proposed for assignment to this project and experienced in project similar in scope, budget, and complexity. The Owner shall have the right to require the Contractor to dismiss from the project, any project team

#### SUMMARY

member with personnel satisfactory to the Owner, at no additional cost. The Contractor shall not replace any project team member without the consent of the Owner, except with personnel satisfactory to the Owner in all respects.

C. The superintendents Identified for special portions of the building shall not be used as skilled or unskilled labor.

#### 1.13 ELECTRONIC DRAWING FILES

- A. AutoCAD (.dwg) and Autodesk Revit (.rvt) files shall be made available by the consulting team for the contractor's use in coordination and preparation of shop drawings.
- B. The Contractor shall submit a written request for the electronic drawing files desired and complete the A/E Team's Agreement of Electronic File Release Form.
- C. Electronic Drawing files will be transmitted via CD/DVD or the FTP site.

#### PART 2 - PRODUCTS

(Not Used)

#### PART 3 - EXECUTION

(Not Used)

#### END OF SECTION 011000

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## March 2019

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Feb 24	25	26	27	28	Mar 1 8:31am ARR: SFB - HGR I 9:16am DPT: HGR - SFB	2
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# April 2019

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7	8 Alfam ARR: SFB - HGR 9:11am DPT: HGR - SFB	9	10 7:57pm ARR: SFB - HGR 8:42pm DPT: HGR - SFB	11	12 8:26am ARR: SFB - HGR 9:11am DPT: HGR - SFB	13
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## May 2019

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#### SECTION 01 23 00 ALTERNATES

#### PART 1 – GENERAL

#### 1.1 SUMMARY

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

#### 1.2 **DEFINITIONS**

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

#### 1.3 **PROCEDURES**

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.
- C. Schedule: A Schedule of Alternates is included at the end of this Section.

#### PART 2 - PRODUCTS

(Not Used)

#### PART 3 - EXECUTION

#### 3.1 SCHEDULE OF ALTERNATES

- A. ALTERNATE No. 1: Passenger Boarding Bridge and Interior Ramp
  - 1. In accordance with the Drawings and Specifications, submit the cost to provide the Passenger Boarding Bridge and Interior Ramp and all associated work as indicated on the Contract Drawings.
- B. ALTERNATE No. 2: Main Terminal Flooring Replacement
  - 1. In accordance with the Drawings and Specifications, submit the cost to provide replacement of the main terminal flooring and sanitary sewer line and all associated work as indicated on the Contract Drawings.
- C. ALTERNATE No. 3: Airline/Concession/Rental Car Counters

- 1. In accordance with the Drawings and Specifications, submit the cost to provide Airline, Concession and Rental Car Counters and all associated work as indicated on the Contract Drawings.
- D. ALTERNATE No. 4: Main Terminal Paint and Wall Finishes
  - 1. In accordance with the Drawings and Specifications, submit the cost to provide paint and wall finishes for the Main Terminal and all associated work as indicated on the Contract Drawings.
- E. ALTERNATE No. 5: Exterior Canopies
  - 1. In accordance with the Drawings and Specifications, submit cost for the exterior canopies (airside and landside) and all associated work as indicated on the Contract Drawings.
- F. ALTERNATE No. 6: New Generator
  - 1. In accordance with the Drawings and Specifications, submit the cost to provide a new diesel generator and all associated work as indicated on the Contract Drawings.

END OF SECTION 012300

### SECTION 01 26 00 CONTRACT MODIFICATION PROCEDURES

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Section 013100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

#### 1.3 MINOR CHANGES IN THE WORK

A. Architect will issue through RPR supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

#### 1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: RPR will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by RPR are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and

finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- e. Quotation Form: Use forms acceptable to RPR.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to RPR.
  - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Include costs of labor and supervision directly attributable to the change.
  - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - 6. Not used.
  - 7. Proposal Request Form: Use form acceptable to RPR.

#### 1.5 ADMINISTRATIVE CHANGE ORDERS

A. Not used.

#### 1.6 CHANGE ORDER PROCEDURES

A. Upon approval of a Work Change Proposal Request by the Owner, FAA and MAA, RPR will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

#### 1.7 CONSTRUCTION CHANGE DIRECTIVE

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

#### 1.8 WORK CHANGE DIRECTIVE

- A. Work Change Directive: RPR may issue a Work Change Directive on EJCDC Document C- 940. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  - 1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.
  - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

#### END OF SECTION 012600
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# SECTION 01 29 00 PAYMENT PROCEDURES

#### PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
  - 1. Document 004373 "Proposed Schedule of Values Form" for requirements for furnishing proposed schedule of values with bid.
  - 2. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 3. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

#### 1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

## 1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with Continuation Sheets.
    - b. Submittals Schedule.
    - c. Contract List
    - d. List of products.
    - e. List of principal suppliers and fabricators.
  - 2. Submit the schedule of values to the RPR at earliest possible date. Initial Applications for Payment will not be reviewed until the Schedule of Values has been reviewed and approved by the RPR.

- 3. Sub schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide sub schedules showing values coordinated with each phase of payment.
- 4. Sub schedules for Separate Elements of Work: Not used.
- 5. Sub schedules for Separate Design Contracts: Not used.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
  - 1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Owner's name.
    - c. Owner's Project number.
    - d. Name of RPR.
    - e. RPR's Project number.
    - f. Contractor's name and address.
    - g. Date of submittal.
  - 2. Arrange schedule of values consistent with format of AIA Document G703.
  - 3. Arrange the Schedule of Values in tabular form, with separate columns to indicate the following for each item listed:
    - a. Related Specification Section or division.
    - b. Description of the Work.
    - c. Name of subcontractor.
    - d. Name of manufacturer or fabricator.
    - e. Name of supplier.
    - f. Change Orders (numbers) that affect value.
    - g. Dollar value.
      - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
  - 4. Provide a breakdown of the Contract Price in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate. Include separate line items under required principal subcontracts for the following items. The value assigned to the total of these line items shall be 5 percent of the Contract Price:
    - a. Testing and commissioning activities.
    - b. Operation and Maintenance manuals.
    - c. Punch list activities.
    - d. Project Record Documents.
    - e. Bonds and warranties.
    - f. Demonstration and training.
  - 5. Round amounts to nearest whole dollar. Total shall equal Contract Price.
  - 6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

- a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.
- 7. Allowances: Not used.
- 8. Purchase Contracts: Provide a separate line item in the schedule of values for each Purchase contract. Show line-item value of Purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
- 9. Overhead Costs, Proportional Distribution: Include total cost and proportionate share of general overhead and profit for each line item.
- 10. Overhead Costs, Separate Line Items: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
- 11. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
- 12. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
- 13. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

# 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by the RPR and paid for by Owner.
  - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Application for Payment shall coincide with monthly schedule update, or as otherwise indicated in the Agreement between the Owner and Contractor. The period covered by each Application for Payment starts on the day following the end of the preceding period and shall not exceed one calendar month, unless otherwise approved by the RPR.
- C. Payment Application Times: Submit Application for Payment to RPR by the 25<sup>th</sup> of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
  - 1. Submit draft copy of Application for Payment seven days prior to due date for review by RPR.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
  - 1. Other Application for Payment forms proposed by the Contractor may be acceptable to RPR and Owner. Submit forms for approval with initial submittal of schedule of values.

- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. RPR will return incomplete applications without action.
  - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
  - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  - 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
  - 5. Include retainage of 5% to be held by owner per Section 90 of the FAA General Provisions.
- F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored onsite and items stored off-site.
  - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
  - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  - 3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- G. Transmittal: Submit three signed and notarized original copies of each Application for Payment to RPR by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
  - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
  - 2. Prior to submitting the three signed and notarized Application for Payment, Contractor shall submit one draft copy of the Application for Payment to the RPR for review and comment one week in advance of submitting signed and notarized Application for Payment.
  - 3. Attach the Certified Payrolls to the transmittal or under separate cover. Pay requests may be reviewed, but not processed until certified payrolls are submitted and approved.

- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
  - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit conditional final or full waivers.
  - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  - 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  - 1. List of subcontractors.
  - 2. Schedule of Values.
  - 3. Contractor's Construction Schedule (preliminary if not final).
  - 4. Products list (preliminary if not final).
  - 5. Submittal Schedule (preliminary if not final).
  - 6. List of Contractor's staff assignments.
  - 7. List of Contractor's principal consultants.
  - 8. Copies of building permits.
  - 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  - 10. Initial progress report.
  - 11. Report of preconstruction conference.
  - 12. Certificates of insurance and insurance policies.
  - 13. Performance and payment bonds.
  - 14. Data needed to acquire Owner's insurance.
  - 15. Initial settlement survey and damage report if required.
  - 16. Submittal and approval of Contractor Safety Plan.
  - 17. Subcontractor Payment Form: (Form J, "Contract Conditions," Section IX, "LDBE").
- J. Monthly Application for Payment: Administrative actions and submittals that shall accompany the submittal of Contractor's monthly Application for Payment include the following:
  - 1. Subcontractor Payment Form.
  - 2. Monthly Progress Report prepared according to requirements specified in Division 01 Section "Construction Progress Documentation."
  - 3. Evidence of payment for material on-site if reimbursement for such material is being requested.
  - 4. Update of Contract Record Documents.
- K. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

- 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Price.
  - a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 017700 "Closeout Procedures."
- 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- L. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
  - 1. Evidence of completion of Project closeout requirements.
  - 2. Certification of completion of final punch list items.
  - 3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  - 4. Updated final statement, accounting for final changes to the Contract Sum.
  - 5. AIA Document G706.
  - 6. AIA Document G706A.
  - 7. AIA Document G707.
  - 8. Evidence that claims have been settled.
  - 9. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  - 10. Final liquidated damages settlement statement.
  - 11. Proof that taxes, fees, and similar obligations are paid.
  - 12. Waivers and releases.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

# SECTION 01 30 00 ADMINISTRATIVE REQUIREMENTS

#### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Field engineering.
- C. Preconstruction meeting.
- D. Site mobilization meeting.
- E. Progress meetings.
- F. Pre-installation meetings.

#### 1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of the specifications to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work 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.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- F. 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.

#### 1.3 FIELD ENGINEERING

- A. The General Contractor shall employ a Land Surveyor registered in the State of Maryland and acceptable to Owner/RPR.
- B. Locate and protect survey control and reference points. Promptly notify RPR of discrepancies discovered.
- C. Control datum for survey is that shown on Drawings.
- D. Verify set-backs and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Submit copy of site drawing and certificate signed by Land Surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.

#### ADMINISTRATIVE REQUIREMENTS

- G. Maintain complete and accurate log of control and survey work as Work progresses.
- H. On completion of foundation walls and major site improvements, prepare certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.
- I. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- J. Promptly report to General Contractor loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- K. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to RPR.

## 1.4 PRECONSTRUCTION MEETING

- A. The Owner/RPR will schedule meeting after Notice of Award.
- B. Attendance Required: Owner, RPR, Architect/Engineer and Contractor.
- C. Agenda:
  - 1. Previously Execution of Owner-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.
  - 4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
  - 5. Designation of personnel representing parties in Contract, and RPR.
  - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  - 7. Security
  - 8. CSPP
  - 9. Airport Operations
  - 10. DBE Procedures and reporting
  - 11. Submittals/RFIs
  - 12. Scheduling.
  - 13. Notice to Proceed
- D. The RPR will record minutes and distribute copies within seven (7) days after meeting to major participants.

## 1.5 SITE MOBILIZATION MEETING

- A. Owner/RPR will schedule meeting at Project site prior to Contractor occupancy.
- B. Attendance Required: Owner, RPR, Architect/Engineer, Special Consultants, and Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
  - 1. Use of premises by Owner and Contractor.
  - 2. Owner's requirements and partial occupancy.
  - 3. Construction facilities and controls provided by Owner.
  - 4. Temporary utilities provided by Contractor
  - 5. Survey and building layout.
  - 6. Security and housekeeping procedures.
  - 7. Schedules.
  - 8. Application for payment procedures.
  - 9. Procedures for testing.
  - 10. Procedures for maintaining record documents.

#### ADMINISTRATIVE REQUIREMENTS

- 11. Requirements for start-up of equipment.
- 12. Inspection and acceptance of equipment put into service during construction period.
- D. The RPR will record minutes and distribute copies within seven (7) days after meeting to participants.

# 1.6 PROGRESS MEETINGS

- A. The Owner/RPR will schedule and administer meetings throughout progress of the Work at weekly intervals.
- B. The General Contractor will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Contractor, major subcontractors and suppliers, Owner, RPR, Architect/Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
  - 1. Review minutes of previous meetings.
  - 2. Review of Work progress.
  - 3. Field observations, problems, and decisions.
  - 4. Identification of problems impeding planned progress.
  - 5. Review of submittals schedule and status of submittals.
  - 6. Review of off-site fabrication and delivery schedules.
  - 7. Maintenance of progress schedule.
  - 8. Corrective measures to regain projected schedules.
  - 9. Planned progress during succeeding work period with two weeks look ahead.
  - 10. Coordination of projected progress.
  - 11. Maintenance of quality and work standards.
  - 12. Effect of proposed changes on progress schedule and coordination.
  - 13. Safety and Security
  - 14. Other business relating to Work.
- E. The RPR will record minutes and distribute copies within seven (7) days after meeting to participants.

#### 1.7 PREINSTALLATION MEETING

- A. When required in individual specification sections, convene preinstallation meeting at Project site prior to commencing work of specific section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific section.
- C. Notify Owner/RPR seven (7) days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  - 1. Review conditions of installation, preparation and installation procedures.
  - 2. Review coordination with related work.
- E. The Contractor will record minutes and distribute copies within seven (7) days after meeting to participants.

#### PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

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# SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

## PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.
  - 3. RFIs.
  - 4. Digital project management procedures.
  - 5. Web-based Project management software package.
  - 6. Project meetings.
    - a. Pre-construction conference.
    - b. Pre-installation conference.
    - c. Progress meetings.
- B. Related Requirements:
  - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

#### 1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from Owner, RPR, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.

- 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Prior to starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
  - 1. Post copies of list in Project meeting room, in temporary field office, and in prominent location in built facility. Keep list current at all times.

## 1.5 GENERAL COORDINATION PROCEDURES

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

#### 1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

- 1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
  - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
  - b. Coordinate the addition of trade-specific information to coordination drawings in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
  - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
  - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
  - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
  - f. Indicate required installation sequences.
  - g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
  - 1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
  - 2. Plenum Space: Indicate sub framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
  - 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms, showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
  - 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
  - 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
  - 6. Mechanical and Plumbing Work: Show the following:
    - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    - c. Fire-rated enclosures around ductwork.
  - 7. Electrical Work: Show the following:
    - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.

- b. Light fixture, exit light, emergency battery pack, smoke detector, and other firealarm locations.
- c. Panel board, switchboard, switchgear, transformer, busway, generator, and motorcontrol center locations.
- d. Location of pull boxes and junction boxes, dimensioned from column center lines.
- 8. Fire-Protection System: Show the following:
  - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
- 9. Review: RPR will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If RPR determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, RPR will so inform Contractor, who shall make suitable modifications and resubmit.
- 10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittals."
- C. Coordination Drawing Process: Prepare coordination drawings in the following manner:
  - 1. Schedule submittal and review of Fire Sprinkler, Plumbing, HVAC, and Electrical Shop Drawings to make required changes prior to preparation of coordination drawings.
  - 2. Commence routing of coordination drawing files with HVAC Installer, who will provide drawing plan files denoting approved ductwork. HVAC Installer will locate ductwork and piping on a single layer, using orange color. Forward drawings to Plumbing Installer.
  - 3. Plumbing Installer will locate plumbing and equipment on a single layer, using blue color.
  - 4. Fire Sprinkler Installer will locate piping and equipment, using red color. Fire Sprinkler Installer shall forward drawing files to Electrical Installer.
  - 5. Electrical Installer will indicate service and feeder conduit runs and equipment in green color. Electrical Installer shall forward drawing files to Communications and Electronic Safety and Security Installer.
  - 6. Communications and Electronic Safety and Security Installer will indicate cable trays and cabling runs and equipment in purple color. Communications and Electronic Safety and Security Installer shall forward completed drawing files to Contractor.
  - 7. Contractor shall perform the final coordination review. As each coordination drawing is completed, Contractor will meet with Architect to review and resolve conflicts on the coordination drawings.
- D. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
  - 1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
  - 2. File Preparation Format: DWG, Version 2018, operating in Microsoft Windows operating system.
  - 3. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format.
  - 4. BIM File Incorporation: Develop and incorporate coordination drawing files into BIM established for Project.
    - a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate

where conflict resolution requires modification of design requirements by Architect.

- 5. Architect/RPR will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
  - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
  - b. Digital Data Software Program: Drawings are available in AutoCAD .dwg and Revit .rvt format, Version 2018 operating in Microsoft Windows operating system.
  - c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and RPR.

# 1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  - 1. RPR will return without response those RFIs submitted to RPR by other entities controlled by Contractor.
  - 2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  - 1. Project name.
  - 2. Owner name.
  - 3. Owner's Project number.
  - 4. Name of RPR.
  - 5. RPR's Project number.
  - 6. Date.
  - 7. Name of Contractor.
  - 8. RFI number, numbered sequentially.
  - 9. RFI subject.
  - 10. Specification Section number and title and related paragraphs, as appropriate.
  - 11. Drawing number and detail references, as appropriate.
  - 12. Field dimensions and conditions, as appropriate.
  - 13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  - 14. Contractor's signature.
  - 15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to RPR.

- 1. Attachments shall be electronic files in PDF format.
- D. RPR's Action: RPR will review each RFI, determine action required, and respond. Allow seven days for RPR's response for each RFI. RFIs received by RPR after 1:00 p.m. will be considered as received the following working day.
  - 1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of RPR's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  - 2. RPR's action may include a request for additional information, in which case RPR's time for response will date from time of receipt by RPR of additional information.
  - 3. RPR's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify RPR in writing within 5 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly.

Software log with not less than the following:

- 1. Project name.
- 2. Name and address of Contractor.
- 3. Name and address of RPR.
- 4. RFI number, including RFIs that were returned without action or withdrawn.
- 5. RFI description.
- 6. Date the RFI was submitted.
- 7. Date RPR's response was received.
- 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
- F. On receipt of RPR's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify RPR within seven days if Contractor disagrees with response.

#### 1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Use of Architect's Digital Data Files: Digital data files of Architect's BIM model and CAD drawings will be provided by Architect for Contractor's use during construction.
  - 1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.

- 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
- 3. Digital Drawing Software Program: Contract Drawings are available in AutoCAD .dwg and Revit .rvt, both Version 2018, operation on Microsoft Windows operating system.
- 4. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
  - a. Subcontractors and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement acceptable to Owner and Architect.
- B. Web-Based Project Management Software Package: Provide, administer, and use web-based Project management software package for purposes of hosting and managing Project communication and documentation until Final Completion.
  - 1. Web-based Project management software includes, at a minimum, the following features:
    - a. Compilation of Project data, including Contractor, subcontractors, Architect, Architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
    - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
    - c. Document workflow planning, allowing customization of workflow between project entities.
    - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
    - e. Track status of each Project communication in real time, and log time and date when responses are provided.
    - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.g. Processing and tracking of payment applications.
    - g. Processing and tracking of payment applications.h. Processing and tracking of contract modifications.
    - i. Creating and distributing meeting minutes.
    - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
    - k. Management of construction progress photographs.
    - 1. Mobile device compatibility, including smartphones and tablets.
  - 2. Provide up to seven Project management software user licenses for use of Owner, RPR, Architect, and Architect's consultants. Provide software training at Architect's office, as directed by the RPR, for web-based Project software users.
  - 3. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.
  - 4. Provide one of the following Project management software packages under their current published licensing agreements:
    - a. Autodesk; Constructware.
    - b. Corecon Technologies, Inc.
    - c. Meridian Systems; Prolog.
    - d. Newforma, Inc.

- e. Procore Technologies, Inc.
- f. Viewpoint, Inc.
- C. PDF Document Preparation: Where PDFs are required to be submitted to RPR, prepare as follows:
  - 1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  - 2. Name file with submittal number or other unique identifier, including revision identifier.
  - 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

## 1.9 PROJECT MEETINGS

- A. General: RPR will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
  - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
  - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, RPR, and Architect, within three days of the meeting.
- B. Preconstruction Conference: RPR will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and RPR, but no later than 30 days after Notice to Proceed.
  - 1. Attendees: Authorized representatives of Owner, RPR, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Responsibilities and personnel assignments.
    - b. Tentative construction schedule.
    - c. Phasing.
    - d. Critical work sequencing and long lead items.
    - e. Designation of key personnel and their duties.
    - f. Lines of communications.
    - g. Use of web-based Project software.
    - h. Procedures for processing field decisions and Change Orders.
    - i. Procedures for RFIs.
    - j. Procedures for testing and inspecting.
    - k. Procedures for processing Applications for Payment.
    - 1. Distribution of the Contract Documents.
    - m. Submittal procedures.
    - n. Preparation of Record Documents.
    - o. Use of the premises and existing building.
    - p. Work restrictions.
    - q. Working hours.
    - r. Owner's occupancy requirements.

- s. Responsibility for temporary facilities and controls.
- t. Procedures for moisture and mold control.
- u. Procedures for disruptions and shutdowns.
- v. Construction waste management and recycling.
- w. Parking availability.
- x. Office, work, and storage areas.
- y. Equipment deliveries and priorities.
- z. First aid.
- aa. Security.
- bb. Progress cleaning.
- 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Sustainable Design Requirements Coordination Conference: Not used.
- D. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.
  - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, RPR, and Owner's Commissioning Authority of scheduled meeting dates.
  - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility requirements.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written instructions.
    - n. Warranty requirements.
    - o. Compatibility of materials.
    - p. Acceptability of substrates.
    - q. Temporary facilities and controls.
    - r. Space and access limitations.
    - s. Regulations of authorities having jurisdiction.
    - t. Testing and inspecting requirements.
    - u. Installation procedures.
    - v. Coordination with other work.
    - w. Required performance results.
    - x. Protection of adjacent work.
    - y. Protection of construction and personnel.

- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
- 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
- 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- E. Project Closeout Conference: RPR will schedule and conduct a project closeout conference, at a time convenient to Owner and RPR, but no later than 90 days prior to the scheduled date of Substantial Completion.
  - 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  - 2. Attendees: Authorized representatives of Owner, RPR, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of Record Documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Procedures for completing and archiving web-based Project software site data files.
    - d. Submittal of written warranties.
    - e. Requirements for completing sustainable design documentation.
    - f. Requirements for preparing operations and maintenance data.
    - g. Requirements for delivery of material samples, attic stock, and spare parts.
    - h. Requirements for demonstration and training.
    - i. Preparation of Contractor's punch list.
    - j. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - k. Submittal procedures.
    - 1. Owner's partial occupancy requirements.
    - m. Installation of Owner's furniture, fixtures, and equipment.
    - n. Responsibility for removing temporary facilities and controls.
  - 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- F. Progress Meetings: RPR will conduct progress meetings at weekly intervals.
  - 1. Coordinate dates of meetings with preparation of payment requests.
  - 2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, RPR, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule,

in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- 1) Review schedule for next period.
- b. Review present and future needs of each entity present, including the following:
  - 1) Interface requirements.
  - 2) Sequence of operations.
  - 3) Resolution of BIM component conflicts.
  - 4) Status of submittals.
  - 5) Status of sustainable design documentation.
  - 6) Deliveries.
  - 7) Off-site fabrication.
  - 8) Access.
  - 9) Site use.
  - 10) Temporary facilities and controls.
  - 11) Progress cleaning.
  - 12) Quality and work standards.
  - 13) Status of correction of deficient items.
  - 14) Field observations.
  - 15) Status of RFIs.
  - 16) Status of Proposal Requests.
  - 17) Pending changes.
  - 18) Status of Change Orders.
  - 19) Pending claims and disputes.
  - 20) Documentation of information for payment requests.
- 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
  - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- G. Coordination Meetings: RPR will conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
  - 1. Attendees: In addition to representatives of Owner, RPR, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether contract is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how

construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- b. Schedule Updating: Revise Contractor's construction schedule after each coordination meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
- c. Review present and future needs of the contractor, including the following:
  - 1) Interface requirements.
  - 2) Sequence of operations.
  - 3) Resolution of BIM component conflicts.
  - 4) Status of submittals.
  - 5) Deliveries.
  - 6) Off-site fabrication.
  - 7) Access.
  - 8) Site use.
  - 9) Temporary facilities and controls.
  - 10) Work hours.
  - 11) Hazards and risks.
  - 12) Progress cleaning.
  - 13) Quality and work standards.
  - 14) Status of RFIs.
  - 15) Proposal Requests.
  - 16) Change Orders.
  - 17) Pending changes.
  - 18) Safety
- 3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

# SECTION 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION

## PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Startup construction schedule.
  - 2. Contractor's Construction Schedule.
  - 3. Construction schedule updating reports.
  - 4. Daily construction reports.
  - 5. Material location reports.
  - 6. Site condition reports.
  - 7. Unusual event reports.
- B. Related Requirements:
  - 1. Section 014000 "Quality Requirements" for schedule of tests and inspections.
  - 2. Section 012900 "Payment Procedures" for schedule of values and requirements for use of cost-loaded schedule for Applications for Payment.

#### 1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine the critical path of Project and when activities can be performed.

- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
  - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
  - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Working electronic copy of schedule file.
  - 2. PDF file.
  - 3. Two paper copies, of sufficient size to display entire period or schedule, as required.
- B. Startup construction schedule.
  - 1. Submittal of cost-loaded startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
  - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
  - 1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
  - 2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.

- 3. Total Float Report: List of activities sorted in ascending order of total float.
- 4. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work until most recent Application for Payment.
- F. Construction Schedule Updating Reports: Submit with Applications for Payment.
- G. Daily Construction Reports: Submit at weekly intervals.
- H. Material Location Reports: Submit at weekly intervals.
- I. Site Condition Reports: Submit at time of discovery of differing conditions.
- J. Unusual Event Reports: Submit at time of unusual event.
- K. Qualification Data: For scheduling consultant.

## 1.5 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of RPR's request.
- B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:
  - 1. Review software limitations and content and format for reports.
  - 2. Verify availability of qualified personnel needed to develop and update schedule.
  - 3. Discuss constraints, including phasing, work stages, area separations, interim milestones and partial Owner occupancy.
  - 4. Review delivery dates for Owner-furnished products.
  - 5. Review submittal requirements and procedures.
  - 6. Review time required for review of submittals and resubmittals.
  - 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
  - 8. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
  - 9. Review and finalize list of construction activities to be included in schedule.
  - 10. Review procedures for updating schedule.

## 1.6 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from entities involved.

2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

# 1.7 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
  - 1. Use Primavera or scheduling component of Project management software package specified in Section 013100 "Project Management and Coordination," for current Windows operating system.
- B. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting, using CPM scheduling.
  - 1. In-House Option: Owner may waive requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
  - 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- C. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- D. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by RPR.
  - 2. Temporary Facilities: Indicate start and completion dates for the following as applicable:
    - a. Securing of approvals and permits required for performance of the Work.
    - b. Temporary facilities.
    - c. Construction of mock-ups, prototypes and samples.
    - d. Owner interfaces and furnishing of items.
    - e. Interfaces with Separate Contracts.
    - f. Regulatory agency approvals.
    - g. Punch list.
  - 3. Procurement Activities: Include procurement process activities for the following long leadtime items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
    - a. Passenger Boarding Bridge (Alternate)
    - b. Counter Millwork (Alternate)

- c. Diesel Generator (Alternate)
- d. Split System Roof Top Units for HVAC systems
- 4. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
- 5. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
- 6. Commissioning Time: Include no fewer than 15 days for commissioning.
- 7. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for RPR's administrative procedures necessary for certification of Substantial Completion.
- 8. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and Final Completion.
- E. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
  - 1. Phasing: Arrange list of activities on schedule by phase.
  - 2. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  - 3. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  - 4. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Partial occupancy before Substantial Completion.
    - e. Use-of-premises restrictions.
    - f. Provisions for future construction.
    - g. Seasonal variations.
    - h. Environmental control.
  - 5. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Subcontract awards.
    - b. Submittals.
    - c. Purchases.
    - d. Mockups.
    - e. Fabrication.
    - f. Sample testing.
    - g. Deliveries.
    - h. Installation.
    - i. Tests and inspections.
    - j. Adjusting.
    - k. Curing.
    - l. Building flush-out.

- m. Startup and placement into final use and operation.
- n. Commissioning.
- 6. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
  - a. Structural completion.
  - b. Temporary enclosure and space conditioning.
  - c. Permanent space enclosure.
  - d. Completion of mechanical installation.
  - e. Completion of electrical installation.
  - f. Substantial Completion.
- 7. Other Constraints:
  - a. Demolition
  - b. Foundations and underground utilities
  - c. Finishes
- F. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion, and the following interim milestones:
  - 1. Temporary hold room enclosure, space conditioning and occupancy.
  - 2. Permanent hold room enclosure, space conditioning and occupancy.
- G. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
  - 1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.
- H. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
  - 1. Unresolved issues.
  - 2. Unanswered Requests for Information.
  - 3. Rejected or unreturned submittals.
  - 4. Notations on returned submittals.
  - 5. Pending modifications affecting the Work and the Contract Time.
- I. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  - 3. As the Work progresses, indicate Final Completion percentage for each activity.

- J. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
- K. Distribution: Distribute copies of approved schedule to RPR, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Post copies in Project meeting rooms and temporary field offices.
  - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

# 1.8 STARTUP CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Not used.

# 1.9 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Not used.

# 1.10 CPM SCHEDULE REQUIREMENTS

- A. Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a time-scaled CPM network analysis diagram for the Work.
  - 1. Develop network diagram in sufficient time to submit CPM schedule, so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
    - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.
  - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
  - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  - 4. Use "one calendar day" as the unit of time for individual activities.

- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
  - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Preparation and processing of submittals.
    - b. Mobilization and demobilization.
    - c. Purchase of materials.
    - d. Delivery.
    - e. Fabrication.
    - f. Utility interruptions.
    - g. Installation.
    - h. Work by Owner that may affect or be affected by Contractor's activities.
    - i. Testing and inspection.
    - j. Commissioning.
    - k. Punch list and Final Completion.
    - 1. Activities occurring following Final Completion.
  - 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
  - 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  - 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
  - 5. Cost and Resource Loading of CPM Schedule: If requested by the RPR, provide cost and resource loaded CPM schedule. Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain RPR's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
    - a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
    - b. Total cost assigned to activities shall equal the total Contract Sum.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

- 1. Contractor or subcontractor and the Work or activity.
- 2. Description of activity.
- 3. Main events of activity.
- 4. Immediately preceding and succeeding activities.
- 5. Early and late start dates.
- 6. Early and late finish dates.
- 7. Activity duration in workdays.
- 8. Total float or slack time.
- 9. Average size of workforce.
- 10. Dollar value of activity (coordinated with the schedule of values).
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
  - 1. Identification of activities that have changed.
  - 2. Changes in early and late start dates.
  - 3. Changes in early and late finish dates.
  - 4. Changes in activity durations in workdays.
  - 5. Changes in the critical path.
  - 6. Changes in total float or slack time.
  - 7. Changes in the Contract Time.
- H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
  - 1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
  - 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
  - 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
  - 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
    - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
    - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

#### 1.11 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  - 1. List of subcontractors at Project site.
  - 2. Approximate count of personnel at Project site.
  - 3. Equipment at Project site.
  - 4. Material deliveries.
  - 5. High and low temperatures and general weather conditions, including presence of rain or snow.
  - 6. Testing and inspection.

- 7. Accidents.
- 8. Meetings and significant decisions.
- 9. Unusual events.
- 10. Stoppages, delays, shortages, and losses.
- 11. Meter readings and similar recordings.
- 12. Emergency procedures.
- 13. Orders and requests of authorities having jurisdiction.
- 14. Change Orders received and implemented.
- 15. Construction Change Directives received and implemented.
- 16. Services connected and disconnected.
- 17. Equipment or system tests and startups.
- 18. Partial completions and occupancies.
- 19. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
  - 1. Material stored prior to previous report and remaining in storage.
  - 2. Material stored prior to previous report and since removed from storage and installed.
  - 3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
  - 1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

## END OF SECTION 013200

# SECTION 01 32 30 PHOTOGRAPHIC DOCUMENTATION

#### PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
  - 2. Periodic construction photographs.

#### 1.2 SUBMITTALS

- A. Construction Photographs: Submit digital images of construction with description of locations and work being completed. Provide to the architect and owner weekly. Provide complete survey of work completed that week.
  - 1. Digital Images: Submit a complete set of digital image electronic files via electronic file transfer. Submit images that have same aspect ratio as the sensor, uncropped.
    - 2. Identification: Provide the following information with each image description in file metadata tag:
      - a. Name of Project.
      - b. Name of RPR.
      - c. Name of Architect/Engineer.
      - d. Name of Contractor.
      - e. Date photograph was taken.
      - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
      - g. Unique sequential identifier keyed to accompanying key plan.

#### 1.3 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

# PART 2 - PRODUCTS

# 2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in uncompressed TIFF format, produced by a digital camera with minimum sensor size of 8.0 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

#### PART 3 - EXECUTION

#### 3.1 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

#### PHOTOGRAPHIC DOCUMENTATION

- 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
  - 1. Date and Time: Include date and time in filename for each image.
  - 2. Field Office Images: Maintain one set of images on USB in the field office at Project site, available at all times for reference. Identify images same as for those submitted to RPR.
- C. Preconstruction Photographs: Before commencement of excavation, commencement of demolition, take color, digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by RPR.
  - 1. Flag excavation areas before taking construction photographs.
  - 2. Take eight photographs to show existing conditions adjacent to property before starting the Work.
  - 3. Take eight photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
- D. Periodic Construction Photographs: Take digital photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Additional Photographs: RPR may issue requests for additional photographs, in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
  - 1. Three days' notice will be given, where feasible.
  - 2. In emergency situations, take additional photographs within 24 hours of request.
  - 3. Circumstances that could require additional photographs include, but are not limited to, the following:
    - a. Special events planned at Project site.
    - b. Immediate follow-up when on-site events result in construction damage or losses.
    - c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or allowances.
    - d. Substantial Completion of a major phase or component of the Work.
    - e. Extra record photographs at time of final acceptance.
    - f. Owner's request for special publicity photographs.

# END OF SECTION

# SECTION 01 33 00 SUBMITTAL PROCEDURES

## PART 1 - GENERAL

#### 1.1 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

#### 1.2 RELATED SECTIONS

- A. Section 01 31 00 Project Management and Coordination for progress meetings, schedules and related software.
- B. Section 01 32 30 Photographic Documentation for submitting construction photographs.
- C. Section 01 40 00 Quality Requirements for submitting test and inspection reports.
- D. Section 01 77 00 Closeout Procedures for submitting warranties.
- E. Section 01 78 20 Operation and Maintenance Data for submitting operation and maintenance manuals.
- F. Section 01 79 00 Demonstration and Training for submitting video of demonstration of equipment and training of Owner's personnel.

#### 1.3 DEFINITIONS

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

#### 1.4 ELECTRONIC SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that requires sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
  - 3. Without change to the Contract Duration, RPR reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- C. Summary:
  - 1. Shop drawing and product data submittals shall be transmitted to RPR in electronic (PDF) format using a website service designed specifically for transmitting submittals between construction team members.
  - 2. The intent of electronic submittals is to expedite the construction process by reducing paperwork, improving information flow, and decreasing turnaround time.
- 3. The electronic submittal process is not intended for color samples, color charts, or physical material samples.
- D. Procedures:
  - 1. Submittal Preparation Contractor may use any or all of the following options:
    - a. Subcontractors and Suppliers provide electronic (PDF) submittals to Contractor via the submittal exchange website.
    - b. Subcontractors and Suppliers provide paper submittals to General Contractor who electronically scans and converts to PDF format.
    - c. Subcontractors and Suppliers provide paper submittals to Scanning Service which electronically scans and converts to PDF format.
  - 2. Contractor shall review and apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents including verification of manufacturer / product, dimensions and coordination of information with other parts of the work.
  - 3. Contractor shall transmit each submittal to RPR using the website.
  - 4. Architect / Engineer review comments will be made available on the website for downloading. Contractor will receive email notice of completed review.
  - 5. Distribution of reviewed submittals to subcontractors and suppliers is the responsibility of the Contractor.
- E. Costs:
  - General Contractor shall include the full cost of the electronic document processing service subscription and printing of submittals in their proposal.
    Internet Service and Equipment Requirements:
    - a. Email address and Internet access at Contractor's main office.
      - b. Adobe Acrobat (<u>www.adobe.com</u>), Bluebeam PDF Revu (<u>www.bluebeam.com</u>), or other similar PDF review software for applying electronic stamps and comments.
- F. Processing Time: Allow enough time for submittal review, including time for resubmittals. Time for review shall commence on RPR's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals in sufficient time and advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow 15 calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. RPR will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 3. Resubmittal Review: Allow 15 calendar days for review of each resubmittal.
  - 4. Sequential Review: Where sequential review of submittals by RPR, or other parties is required, allow 21 calendar days, excluding holidays, for initial review of each submittal.
  - 5. No extension of the Contract Time will be authorized because of failure to transmit submittals to RPR enough in advance of the Work to permit processing. Processing of incomplete or unacceptable submissions by RPR shall not reduce the number of calendar days specified above for RPR's review. Resubmissions shall be treated the same as initial submissions relative to review time.
  - 6. Notations on submittals that increase the Contract cost or time of completion shall be brought to RPR's attention before proceeding with the Work.
- G. Identification: Place a permanent label or title block on each submittal for identification.

- 1. Indicate name of firm or entity that prepared each submittal on label or title block.
- 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by RPR, Owner and Architect/Engineer.
- 3. Include the following information on label for processing and recording action taken:
  - a. Project name.
  - b. Date.
  - c. Name and address of RPR.
  - d. Name and address of Architect.
  - e. Name and address of Contractor.
  - f. Name and address of subcontractor, if applicable.
  - g. Name and address of supplier, if applicable.
  - h. Name of manufacturer, if applicable.
  - i. Submittal number or other unique identifier, including revision identifier.
    - Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06 10 00.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06 10 00.01.A).
  - j. Number and title of appropriate Specification Section.
  - k. Drawing number and detail references, as appropriate.
  - 1. Location(s) where product is to be installed, as appropriate.
  - m. Transmittal number.
  - n. Other necessary identification.
  - o. Allow 15 calendar days, excluding holidays, for processing each resubmittal.
- H. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- I. Copies: In addition to submittal copies required at time of approved and project closeout and unless RPR observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
  - 1. Additional copies submitted for Operations and Maintenance manuals will be marked with action taken and will be returned.
- J. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. RPR will discard submittals received from sources other than Contractor.
  - 1. Transmittal Form: As approved by Owner and RPR.
- K. Resubmittals: Make resubmittals in same form as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked "Approved" or "Approved as Noted".
- L. Distribution: Contractor shall furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, and installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- M. Use for Construction: Use only final submittals with mark indicating "Approved" or "Approved as Noted" by RPR.

## 1.5 SUBMITTAL LOG

- A. Prepare a log that contains a complete listing of all submittals required by Contract. Submit the log at the preconstruction meeting along with Contractor's construction schedule specified in Division 01 Section "Construction Progress Documentation." Organize the submittal log by Section number. Assign each submittal a sequential number for identification and tracking purposes.
  - 1. Coordinate the submittal log with Division 01 Section "Construction Progress Documentation." The submittal log shall be submitted for RPR's review. Include the following information:
    - a. Title of submittal/description.
    - b. Submittal number (sequential).
    - c. Scheduled date for the first submittal.
    - d. Drawing number, if applicable.
    - e. Applicable Section number.
    - f. Name of subcontractor/vendor.
    - g. Scheduled date of RPR's final release or approval.

## PART 2 - PRODUCTS

#### 2.1 ELECTRONIC DOCUMENT PROCESSING SERVICE

- A. To expedite the electronic review process, the contractor shall procure the services and process all documents through a web-based software service.
- B. Transmittal of documents via email, FTP or paper will not be accepted unless specifically noted elsewhere.
- C. The web-based software shall provide an unlimited number of users added to the project by the Owner or RPR at no additional cost. The RPR will be provided Administrative permissions and privileges.
- D. The web-based software shall provide status logs, reports, searching and automated notifications.
- E. The web-based software shall include at a minimum the following modules subject to final approval by Owner and RPR:
  - 1. Submittals
  - 2. Submittal Register
  - 3. RFIs (Request for Information)
  - 4. Field Reports
  - 5. Draft Pay Applications
  - 6. Storage for Construction Documents and Specifications
  - 7. Revision Documents (ASI, CCD, PR, PCO, COR, CO, etc.)
  - 8. Meeting Minutes
  - 9. Gantt charts and milestones
- F. The web-based software shall provide integrated web-based markup tools. All users shall be able to markup a centralized file to eliminate redundancy of files.

- G. The routing of the documents shall be automated, so the documents can be transmitted by the Contractor to the RPR and then automatically sent to design team users by the RPR based on trade or discipline.
- H. The web-based software company shall provide a minimum of two training sessions per project by web conference or prerecorded video training.
- I. The web-based software shall include a downloadable offline archive of all project data.
- J. The web-based software shall provide tools for subcontractors to submit documents to contractor. Software must be capable of allowing contractor to review information before submitting to the design team and owner. It is at the contractor's discretion if the subcontractor submits documents through the web-based software.
- K. Color samples and other submittals requiring physical review shall be logged into the system and delivered by mail or courier.
- L. Acceptable Providers
  - 1. Newforma Project Cloud
    - Web Åddress <u>www.newformaprojectcloud.com</u>
    - Phone 800-303-4650
    - email projectcloud@newforma.com
    - Procore Project Management Web Address - <u>www.procore.com/project-management</u> Phone - 866-477-6267
      - email <u>support@procore.com</u>
  - 3. Software equal to those listed above and acceptable to the RPR and Architect.

## 2.2 ACTION SUBMITTALS

2.

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment. **Partial submittals shall be unacceptable.** 
  - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's written recommendations.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's installation instructions.
    - d. Standard color charts
    - e. Manufacturer's catalog cuts.
    - f. Wiring diagrams showing factory-installed wiring.
    - g. Printed performance curves.
    - h. Operational range diagrams.
    - i. Mill reports.
    - j. Standard product operating and maintenance manuals.
    - k. Compliance with recognized trade association standards.
    - 1. Compliance with recognized testing agency standards.
    - m. Compliance with specified referenced standards.
    - n. Testing by recognized testing agency.
    - o. Notation of coordination requirements.

- 4. Number of Copies: Unless submittal requires physical review, Contractor shall not be required to submit physical copies to the RPR. Contractor shall keep one printed copy of the approved/accepted submittal in the Contractor field office.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
  - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation drawings.
    - d. Roughing-in and setting diagrams.
    - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    - f. Shop work manufacturing instructions.
    - g. Templates and patterns.
    - h. Schedules.
    - i. Notation of coordination requirements.
    - j. Notation of dimensions established by field measurement.
    - k. Relationship to adjoining construction clearly indicated.
    - 1. Seal and signature of professional engineer if specified.
    - m. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
  - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
  - 3. Number of Copies: Unless requested, Contractor shall not be required to submit physical copies to the RPR. Contractor shall keep one printed copy of the approved/accepted shop drawing in the Contractor field office.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
  - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of appropriate Specification Section.
  - 3. Disposition: Maintain sets of approved Samples at Project site, available for quality- control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
  - 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit four (4) full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
  - 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples

include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- a. Number of Samples: Submit four (4) sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location.
  - 1. Number of Copies: Submit three (3) copies of product schedule or list, unless otherwise indicated. RPR will return two copies.
- F. Application for Payment: Comply with requirements in Division 01 Section "Application for Payment."
- G. Schedule of Values: Comply with requirements specified in General Conditions for Construction Contracts.
- H. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation."
- I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design.
  - 1. Number of Copies: Submit copies of subcontractor list in accordance with this specification section.

## 2.3 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
  - 1. Number of Copies: Provide two (2) approved "hard" copies on site for job reference.
  - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
  - 3. Test and Inspection Reports: Comply with requirements specified in Section 01 40 00 Quality Requirements.
- B. Coordination Drawings: Comply with requirements when specified in individual sections.
- C. Contractor's Construction Schedule: Comply with requirements specified in the General Conditions for Construction Contracts.
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying

that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- M. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- N. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- O. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Section 01 78 20 Operation and Maintenance Data.
- Q. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include professional certifications, as required, and page numbers.
- R. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

- S. Manufacturer's Field Reports: Prepare written information documenting factoryauthorized service representative's tests and inspections. Include the following, as applicable:
  - 1. Statement on condition of substrates and their acceptability for installation of product.
  - 2. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  - 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
- T. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- U. Construction Photographs: Comply with requirements specified in Section 01 32 30 Photographic Documentation.

## 2.4 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to RPR.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

## PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S REVIEW

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

## 3.2 RPR'S ACTION

- A. General: RPR shall not review submittals that do not bear Contractor's approval stamp and shall return them without action.
- B. Action Submittals: RPR/Architect shall review each submittal, make marks to indicate corrections or modifications required, and return it. Architect shall stamp each submittal with an action stamp and shall mark stamp appropriately to indicate action taken, as

follows:

- 1. Approved: Means fabrication/installation may be undertaken. Approval does not authorize changes to the Contract Price or the Contract Time.
- 2. Approved as Noted: Same as "Approved," providing Contractor complies with corrections noted on submittal. Resubmission required only if Contractor is unable to comply with noted corrections.
- 3. Revise and Resubmit: Fabrication and/or installation may not be undertaken. Make appropriate revisions and resubmit, limiting corrections to items marked.
- 4. Rejected: Submittal does not comply with requirements. Fabrication and/or installation may not be undertaken. Prepare a new submittal according to requirements and submit without delay.
- C. Informational Submittals: RPR shall review each submittal and will not return it or will return it if it does not comply with requirements. RPR shall forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, shall be considered nonresponsive, and shall be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

## END OF SECTION

## SECTION 01 40 00 QUALITY REQUIREMENTS

# PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality- assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 2. Requirements for Contractor to provide quality-assurance and -control services required by RPR, Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Section 01 41 00 Inspection and Testing Laboratory Services for inspection testing laboratory requirements.
- D. See Divisions 02 through 34 Sections for specific test and inspection requirements.
- E. See Item C-100 for Contractor Quality Control Program (CQCP) requirements.

#### 1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by RPR.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.
- I. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### 1.3 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to RPR for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to RPR for a decision before proceeding.

#### 1.4 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Reports: Prepare and submit certified written reports that include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.
  - 8. Complete test or inspection data.
  - 9. Test and inspection results and an interpretation of test results.
  - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 12. Name and signature of laboratory inspector.
  - 13. Recommendations on retesting and re-inspecting.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices,

receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

## 1.5 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Owner/RPR.
  - 2. Notify Owner/RPR seven days in advance of dates and times when mockups will be constructed.

- 3. Demonstrate the proposed range of aesthetic effects and workmanship.
- 4. Obtain RPR and Architect's approval of mockups before starting work, fabrication, or construction.
- 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- 6. Demolish and remove mockups when directed, unless otherwise indicated.

## 1.6 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
  - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  - 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractors Responsibilities: Tests and inspections not explicitly assigned to Owner are the Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  - 1. Where services are indicated, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  - 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  - 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  - 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  - 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "SubmittalProcedures."
- D. Retesting / Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with RPR and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  - 1. Notify Öwner, RPR and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  - 2. Determine the location from which test samples will be taken and in which in- situ tests are conducted.
  - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  - 5. Do not release, revoke, alter, or increase the Contract Document requirements or

approve or accept any portion of the Work.

- 6. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
  - 1. Access to the Work.
  - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
  - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  - 4. Facilities for storage and field curing of test samples.
  - 5. Delivery of samples to testing agencies.
  - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  - 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required qualityassurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

## 1.7 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
  - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
  - 2. Notifying RPR and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  - 3. Submitting a certified written report of each test, inspection, and similar qualitycontrol service to RPR with copy to Contractor and to authorities having jurisdiction.
  - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  - 6. Retesting and re-inspecting corrected work.

#### PART 2 - PRODUCTS

(Not Used)

## PART 3 - EXECUTION

#### 3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in

## **QUALITY REQUIREMENTS**

other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

- 2. Comply with the Contract Document requirements for Division 01 Section "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.
- 3.2 SCHEDULE OF MOCK-UPS
  - A. Exterior Wall Section (Metal Stud Back Up): 8'-0" H x 8'-0" W illustrating architectural stone veneer, CMU back up, 2'-0" x 2'-0" window unit and all associated construction materials, metal studs and sheathing.
  - B. Floor tile system with expansion joints, grout, trim, crack isolation membrane, thresholds and wall base. Illustrate proposed pattern with all colors and styles.

## END OF SECTION

## SECTION 01 41 00 INSPECTION AND TESTING LABORATORY SERVICES

#### PART 1 GENERAL

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

#### 1.2 SECTION INCLUDES

- A. Selection and payment.
- B. Laboratory responsibilities.
- C. Laboratory reports.
- D. Limits on testing laboratory authority.
- E. Contractor responsibilities.
- F. Schedule of inspections and tests.

#### 1.3 RELATED SECTIONS

- A. Section 01 33 00 Submittals: Manufacturer's certificates.
- B. Section 01 40 00 Quality Requirements.
- C. Section 02 01 00 Subsurface Soil Exploration.

#### 1.4 REFERENCES

- A. ANSI/ASTM D 3740 Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- B. ANSI/ASTM E 329 Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

### 1.5 SELECTION AND PAYMENT

- A. The Contractor will coordinate, employ and pay for services of an independent testing laboratory to perform specified inspection and testing as identified within the specifications. This effort shall be instituted by the Contractor as part of the Contractor's Quality Control (CQCP) program.
- B. Employment of a separate testing laboratory (CITF) by the Owner for Quality Assurance (QA) shall in no way relieve Contractor of obligation to perform work in compliance with requirements of Contract Documents.

#### 1.6 LABORATORY RESPONSIBILITIES

A. Test samples of mixes submitted by Contractor to testing laboratory.

- B. Provide qualified personnel at site. Cooperate with Owner/RPR and Contractor in performance of services.
- C. Perform specified inspection, sampling, and testing of products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Contractor and Owner's Representative of observed irregularities or nonconformance of Work or products.
- F. Perform additional inspections and tests required by RPR.
- G. Attend preconstruction conferences and progress meetings.

## 1.7 LABORATORY REPORTS

- A. After each inspection and test, promptly submit 4 copies of laboratory report to Contractor, with copies sent directly to the Owner, RPR, the Architect, the Civil Engineer, the Structural Engineer and other consultant engineers associated with the specification Section.
- B. Include:
  - 1. Data issued.
  - 2. Project title and number.
  - 3. Name of inspector.
  - 4. Date and time of sampling or inspection.
  - 5. Identification of product and Specification Section.
  - 6. Location in the Project.
  - 7. Type of inspection or test.
  - 8. Date of test.
  - 9. Results of tests.
  - 10. Compliance with Contract Documents.
- C. When requested by RPR or Architect/Engineer, provide interpretation of test results.

## 1.8 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.
- D. Laboratory has no authority to stop the Work unless life-threatening health or safety conditions exist. The laboratory shall notify the RPR, Owner and Contractor immediately.

### 1.9 CONTRACTOR RESPONSIBILITIES

A. Deliver to laboratory at agreed upon location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.

- B. Cooperate with laboratory personnel, inclusive of Owner's CITF for QA and provide access to the Project.
- C. Provide incidental labor and facilities to provide access to Work to be tested, to obtain and handle samples at the site or at source of products to be tested, and to facilitate tests and inspections, storage and curing of test samples.
- D. Notify RPR and his quality assurance (CITF) and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.

## PART 2 PRODUCTS

(Not Used)

## PART 3 EXECUTION

## 3.1 SCHEDULE OF INSPECTIONS AND TESTS

The following list is not meant to be all inclusive. The Contractor shall produce a schedule of all inspections, test, balancing, etc. in compliance with the Contract Documents and the individual specification sections.

- A. Section 03 30 00 Cast-in-Place Concrete: Requirements for Reinforcing Steel Placement.
- B. Section 03 30 00 Cast-in-Place Concrete: Requirements for sampling and testing concrete materials and reinforcing steel placement.
- C. Section 04 10 00 Masonry Mortar and Grout: Requirements for sampling and testing mortar and grout cubes.
- D. Section 05 12 00 Structural Steel Framing: Testing of connections and verification of member sizes.
- E. Section 05 31 00 Steel Decking: Field inspection of deck profile span orientation and connections.
- F. Section 22 11 16 Domestic Water Piping: Requirements for system testing.
- G. Section 22 11 16 Domestic Water Piping: Field Quality Control (Tests furnished by the Plumbing Contractor)
- H. Section 22 13 16 Sanitary Waste and Vent Piping: Requirements for system testing.
- I. Section 22 14 13 Facility Storm Drainage Piping: Requirements for system testing.
- J. Section 23 05 01 Mechanical Firestopping: Inspection report.
- K. Section 23 05 93 Testing, Adjusting and Balancing for HVAC (Tests furnished by the Mechanical Contractor)
- L. Section 26 05 00 Common Work Results for Electrical: Field Quality Control, Acceptance Testing (Tests furnished by the Electrical Contractor)
- M. Section 26 05 26 Grounding and Bonding for Electrical Systems: Field QualityControl, Acceptance Testing (Tests furnished by the Electrical Contractor)

- N. Section 26 22 00 Low Voltage Transformers: Field Quality Control, Acceptance Testing. (Tests furnished by the Electrical Contractor)
- O. Section 26 32 13 Engine Generators: Field Quality Control, Site Tests (Tests furnished by the Electrical Contractor)
- P. Section 26 36 00 Transfer Switches: Field Quality Control, Acceptance Testing (Tests furnished by the Electrical Contractor)
- Q. Section 28 23 10 Security Intercom: Field Quality Control, Acceptance Testing Tests furnished by the Electrical Contractor)
- R. Section 28 31 11 Fire Alarm System: Manufacturer's Field Services. (Tests furnished by the Electric Contractor)

# END OF SECTION

## SECTION 01 42 00 REFERENCES

## PART 1 - GENERAL

#### 1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey RPR's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by RPR. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

## 1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list.

ADAAG	Americans with Disabilities Act
(ADA)	Architectural Barriers Act (ABA)
CFR	Code of Federal Regulations
CRD	Handbook for Concrete and Cement
DOD	Department of Defense Military Specifications and Standards
DSCC	Defense Supply Center Columbus (See FS)
FED-STD	Federal Standard (See FS)
FS	Federal Specification
FTMS	Federal Test Method Standard (See FS)
ICC-ES	ICC Evaluation Service, Inc.
MIL	(See MILSPEC) MIL-STD (See MILSPEC)
MILSPEC	Military Specification and Standards
NES	National Evaluation Service (See ICC-ES)
UFAS	Uniform Federal Accessibility Standards

## 1.3 ABBREVIATIONS AND ACRONYMS

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

AA	Aluminum Association, Inc. (The)
AAADM	American Association of Automatic Door Manufacturers
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ABMA	American Bearing Manufacturers Association
ACI	ACI International (American Concrete Institute)
ACPA	American Concrete Pipe Association
AEIC	Association of Edison Illuminating Companies, Inc.
AF&PA	American Forest & Paper Association
AGA	American Gas Association
AGC	Associated General Contractors of America
AHA	American Hardboard Association (Now part of CPA)
AHAM	Association of Home Appliance Manufacturers
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction AISI American Iron and Steel
	Institute
AITC	American Institute of Timber Construction
ALCA	Associated Landscape Contractors of America
ALSC	American Lumber Standard Committee, Incorporated
AMCA	Air Movement and Control Association International, Inc.
ANSI	American National Standards Institute
AOSA	Association of Official Seed Analysts
APA	The Engineered Wood Association

APA	Architectural Precast Association
API	American Petroleum Institute
ARI	Air-Conditioning & Refrigeration Institute
ARMA	Asphalt Roofing Manufacturers Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	The American Society of Mechanical Engineers
ASME Interna	tional - The American Society of Mechanical Engineers International
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials International
ASTM Interna	tional - American Society for Testing and Materials International
AWCI Internat	tional - Association of the Wall and Ceiling Industries International
AWCMA	American Window Covering Manufacturers Association
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association (The)
BICSI	
BIFMA	Business and Institutional Furniture Manufacturers Association
BIFMA Intern	ational - Business and Institutional Furniture Manufacturer's
DIGGG	Association International)
BISSC	Baking Industry Sanitation Standards Committee
CCC	Carpet Cushion Council
CDA	Copper Development Association Inc.
CEA	Canadian Electricity Association
CFFA	Chemical Fabrics & Film Association. Inc.
CGA	Compressed Gas Association
CGSB	Canadian General Standards Board
CIMA	Cellulose Insulation Manufacturers Association
CISCA	Ceilings & Interior Systems Construction Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CPA	Composite Panel Association
CPPA	Corrugated Polyethylene Pipe Association
CRI	Carpet & Rug Institute (The)
CRSI	Concrete Reinforcing Steel Institute
CSA Internation	onal - Formerly: IAS - International Approval Services)
CSI	Construction Specifications Institute(The)
CSSB	Cedar Shake & Shingle Bureau
CTI	Cooling Technology Institute
	(Formerly: Cooling Tower Institute)
DHI	Door and Hardware Institute
EIA	Electronic Industries Alliance
EIMA	Industry Mambars Association
EICDC	nuusu y Mennoers Association
	Engineers John Contract Documents Committee
	Expansion Joint Manufacturers Association, Inc.

ESD	ESD Association	
FCI	Fluid Controls Institute	
FIBA	Federation Internationale de Basketball Amateur	
	(The International Basketball Federation)	
FIVB	Federation Internationale de Volleyball	
	(The International VolleyballFederation)	
FM	Factory Mutual System (Now FMG)	
FMG	FM Global (Formerly: FM - Factory Mutual System)	
FRSA	Florida Roofing Sheet Metal & Air Conditioning Contractors	
11011	Association Inc	
FSA	Fluid Sealing Association FSC Forest Stewardship Council	
GA	Gypsum Association	
GANA	Glass Association of North America	
GBC	Green Building Council	
GRI	(Now GSI) GS Green Seal	
GSI	Geosynthetic Institute	
051	Geosynthetic institute	
HI	Hydraulic Institute	
HI	Hydronics Institute	
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association	
HDW	H D White I aboratory Inc	
111 **	II. I. White Laboratory, me.	
IAS	International Approval Services (Now CSA International)	
IBF	International Badminton Federation	
ICEA	Insulated Cable Engineers Association Inc	
ICDI	International Concrete Papair Institute, Inc.	
	International Concrete Repair Institute, Inc.	
IEC		
IEEE	Institute of Electrical and Electronics Engineers, Inc.	
IESNA	Illuminating Engineering Society of North America	
IGCC	Insulating Glass Certification Council	
IGMA	Insulating Glass Manufacturers Alliance	
ILI	Indiana Limestone Institute of America, Inc.	
ISO	International Organization for Standardization	
ISSFA	International Solid Surface Fabricators Association	
ITS	Intertek	
ITU	International Telecommunication Union	
-		
KCMA	Kitchen Cabinet Manufacturers Association	
LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute	
	Matal Duilding Manufacturers Association	
	Metal Bunding Manufacturers Association	
MFMA	Maple Flooring Manufacturers Association	
MFMA	Metal Framing Manufacturers Association	
MH	Material Handling (Now MHIA)	
MHIA	Material Handling Industry of America	
MIA	Marble Institute of America	
MPI	Master Painters Institute	
MSS	Manufacturers Standardization Society of The Valve and Fittings	
	Industry Inc.	
NAAMM	National Association of Architectural Metal Manufacturers	
NACE	National Association of Corrosion Engineers	
NACE International - National Association of Corrosion Engineers International)		

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	NADCA	National Air Duct Cleaners Association	
	NAGWS	National Association for Girls and Women in Sport	
	NAIMA	North American Insulation Manufacturers Association	
	NBGQA	National Building Granite Quarries Association, Inc.	
	NCAA	National Collegiate Athletic Association	
	NCMA	National Concrete Masonry Association	
	NCPI	National Clay Pipe Institute	
	NCARB	National Council of Architectural Registration Boards	
	NCTA	National Cable & Telecommunications Association	
	NEBB	National Environmental Balancing Bureau	
	NECA	National Electrical Contractors Association	
	Nel MA	Northeastern Lumber Manufacturers' Association	
	NEMA	National Electrical Manufacturers Association	
	NETA	InterNational Electrical Testing Association	
	NEUS	National Education of State High School Associations	
	NEDA	National Fire Protection Association	
	NFPA		
	NFRC	National Fenestration RatingCouncil	
	NGA	National Glass Association	
	NHLA	National Hardwood Lumber Association	
	NLGA	National Lumber Grades Authority	
	NOFMA	National Oak Flooring Manufacturers Association	
	NRCA	National Roofing Contractors Association	
	NRMCA	National Ready Mixed Concrete Association	
	NSF	National Sanitation Foundation	
	NSF Internation	nal - National Sanitation Foundation International	
	NSSGA	National Stone, Sand & Gravel Association	
	NTMA	National Terrazzo & Mosaic Association, Inc.	
	NTRMA	National Tile Roofing Manufacturers Association (Now RTI)	
	NWWDA	National Wood Window and Door Association (Now WDMA	)
	OPL	Omega Point Laboratories, Inc.	
	PCI	Precast / Prestressed Concrete Institute	
	PDCA	Painting & Decorating Contractors of America	
	PDI	Plumbing & Drainage Institute	
	PGI	PVC Geomembrane Institute	
	PTI	Post-Tensioning Institute	
	RCSC	Research Council on Structural Connections	
	RFCI	Resilient Floor Covering Institute	
	RIS	Redwood Inspection Service	
	RTI	(Formerly: NTRMA - National Tile Roofing Manufacturers A	Association)
		(Now TRI)	
	SAE		
	SAE Internation	nal	
	SDI	Steel Deck Institute	
	SDI	Steel Door Institute	
	SEFA	Scientific Equipmentand Furniture Association	
	SEI	Structural Engineering Institute	
	SGCC	Safety Glazing Certification Council	
	SIA	Security Industry Association	
	SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGM	IA)
	SJI	Steel Joist Institute	
	SMA	Screen Manufacturers Association	
	SMACNA	Sheet Metal and Air Conditioning Contractors' National Assoc	ciation
	SMPTE	Society of Motion Picture and Television Engineers	

## REFERENCES

TERMINAL BUILD HAGERSTOWN RE AIP 3-24-0019-059-2	DING EXPANSION EGIONAL AIRPORT 2018 (DESIGN): MA	F – RICHARD A. HENSON FIELD A-GR-19-009 (DESIGN)	BID NO. PUR-1410 BID DOCUMENTS MARCH 2019
7111 3-24-0017-037-2	SPFA	Spray Polyurethane Foam Alliance	Miniken 2017
	51171	(Formerly: SPI/SPED The Society of the	
		Disation Industry, In Correct Delyumethone	
		Plastics industry, in.; Spray Polyuretnane	
		Foam Division)	
	SPIB	Southern Pine Inspection Bureau (The)	
	SPI/SPFD	Society of the Plastics Industry, Inc. (The)	
		Spray Polyurethane Foam Division (Now SPFA)	
	SPRI	Single Ply Roofing Institute	
	SSINA	Specialty Steel Industry of North America	
	SSPC	The Society for Protective Coatings	
	STI	Steel Tank Institute	
	SWI	Steel Window Institute	
	SWRI	Sealant, Waterproofing, & RestorationInstitute	
	TCA	Tile Council of America, Inc.	
	TIA/EIA	Telecommunications Industry Association / Electronic Ind	lustries Alliance
	TMS	The Masonry Society	
	TPI	Truss Plate Institute. Inc.	
	TPI	Turfgrass Producers International	
	TRI	Tile Roofing Institute (Formerly: RTI - Roof Tile Institute	e)
	UL	Underwriters Laboratories Inc.	
	UNI	Uni-Bell PVC Pipe Association	
	USAV	USA Volleyball	
	USGBC	U.S. Green Building Council	
	USITT	United States Institute for Theatre Technology, Inc.	
	WASTEC	Waste Equipment Technology Association	
	WCLIB	West Coast Lumber Inspection Bureau	
	WCLID	Window Constitution Manufacture Acception (New WCG	
	WCMA	window Covering Manufacturers Association (Now WCS	SC)
	WCSC	Window Covering Safety Council	
		(Formerly: WCMA - Window Covering Manufacturers A	ssociation)
	WDMA	Window & Door Manufacturers Association (Formerly: N	NWWDA -
		National Wood Window and Door Association)	
	WI	Woodwork Institute	
		(Formerly WIC - Woodwork Institute of California)	
	WIC	Woodwork Institute of California (Now WI)	
	WMMPA	Wood Molding & Millwork Producers Association	
	WSPCA	Western States Poofing Contractors Association	
	WWPA	Western Wood Products Association	
C.	Code Agencies Contracts Docu list.	: Where abbreviations and acronyms are used in Specifi ments, they shall mean the recognized name of the entities	cations or other in the following
	BOCA	BOCA International Inc. (Now ICC)	
	CABO	Council of American Building Officials (Now ICC)	

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

CE	Army Corps of Engineers
CPSC	Consumer Product Safety Commission
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FCC	Federal Communications
	Commission
FDA	Food and Drug Administration
GSA	General Services Administration
HUD	Department of Housing and Urban
	Development
LBL	Lawrence Berkeley National Laboratory
NCHRP	National Cooperative Highway Research Program (See TRB)
NIST	National Institute of Standards and Technology
OSHA	Occupational Safety & Health
	Administration
PBS	Public Building Service (See GSA)
PHS	Office of Public Health and Science
RUS	Rural Utilities Service (See USDA)
SD	State Department
TRB	Transportation Research Board
USDA	United States Department of Agriculture
USPS	United States Postal Service

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

DGS	Department of General Services
DLLR	Department of Licensing and Labor Regulation
DNR	Department of Natural Resources
MAA	Maryland Aviation Administration
MDARNG	Maryland Army National Guard
MDE	Maryland Department of the Environment
MDOT	Maryland Department of Transportation
SHA	State Highway Administration

## PART 2 – PRODUCTS

(Not Used) PART 3 - EXECUTION

(Not Used)

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## SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. See Item C-102, Temporary Air and Water Pollution, Soil Erosion, and Siltation Control for additional Environmental Control and Protection requirements.
- C. See Item C-105, Mobilization for additional RPR Field Office and Sign Posting requirements.

#### 1.2 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
  - 1. Sewers and drainage.
  - 2. Water service and distribution.
  - 3. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
  - 4. Heating and cooling facilities.
  - 5. Ventilation.
  - 6. Electric power service.
  - 7. Lighting.
  - 8. Telephone service.
- B. Support facilities include, but are not limited to, the following:
  - 1. Temporary roads and paving.
  - 2. Dewatering facilities and drains.
  - 3. Project identification and temporary signs.
  - 4. Temporary interior partitions.
  - 5. Waste disposal facilities.
  - 6. Field offices.
  - 7. Storage and fabrication sheds.
  - 8. Construction aids and miscellaneous services and facilities.
- C. Security and protection facilities include, but are not limited to, the following:
  - 1. Environmental protection.
  - 2. Stormwater control.
  - 3. Tree and plant protection.
  - 4. Pest and rodent control.
  - 5. Security enclosure and lockup.
  - 6. Barricades, warning signs, and lights.
  - 7. Fire protection.
- D. Related Sections include the following:
  - 1. Section 01 10 00 Summary for limitations on utility interruptions and other work restrictions.
  - 2. Section 01 33 00 Submittal Procedures for submitting copies of implementation and termination schedule and utility reports.
  - 3. Section 01 73 00 Execution for progress cleaning requirements.
  - 4. Divisions 02 through 34 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

- 5. Section 31 12 00 Flexible Paving for construction and maintenance of asphalt paving for temporary roads and paved areas.
- 6. Section 32 13 00 Rigid Paving for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

## 1.3 DEFINITIONS

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

## 1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner or RPR and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
  - 1. RPR.
  - 2. Architect.
  - 3. County and State personnel.
  - 4. Testing agencies.
  - 5. Personnel of authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water service use charges, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site.
- D. Electric Power Service: Pay electric power service use charges, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site.

#### 1.5 SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel. Any changes to the approved site plan will require approval of the RPR.
- B. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- C. Implementation and Termination Schedule: Within 15 days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

#### 1.6 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

### 1.7 PROJECT CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to RPR/Owner, change over from use of temporary service to use of permanent service.
  - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service

during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

## PART 2 - PRODUCTS

## 2.1 MATERIALS

- A. Pavement: Comply with Requirements in Division 32.
- B. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with galvanized barbed-wire top strand.
- C. Lumber and Plywood: Comply with requirements in Division 06 Section "Finish Carpentry."
- D. Gypsum Board: Minimum 1/2-inch-thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36/C 36M.
- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- F. Paint: Comply with requirements in Division 09 Painting.
- G. Temporary Low-Profile Barricades and Lights: See plan sheet GN03.500 Safety Phasing Notes and Details for requirements of barricades and temporary lights.

## 2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading. Refer to FAA General Provisions Section 60 "Control of Work."
- B. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Refer to FAA General Provisions Section 60 "Control of Work."
- C. Furnish and equip offices as follows:
  - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
  - 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack board.
  - 3. Drinking water and private toilet.
  - 4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
  - 5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
- D. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  - 1. Store combustible materials apart from building.

### 2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

#### **TEMPORARY FACILITIES AND CONTROLS**

- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.

## PART 3 - EXECUTION

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

## 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, RPR, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
  - 1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
  - 2. Connect temporary sewers to municipal system as directed by sewer department officials.
  - 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
  - 4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

- F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
  - 1. Install electric power service underground, unless otherwise indicated.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
  - 2. Install lighting for Project identification sign.
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
  - 1. Provide additional telephone lines for the following:
    - a. Provide a dedicated telephone line for each facsimile machine and computer in each field office.
    - b. Provide one telephone line(s) for RPR's use.
  - 2. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Architect's office.
    - e. Engineers' offices.
    - f. Owner's office.
    - g. Principal subcontractors' field and home offices.
  - 3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- I. Electronic Communication Service: Provide temporary electronic communication service (internet connection), including electronic mail, in Contractor field office for Contractor and RPR use.

#### 3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
  - 1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with latest NFPA Regulations.
  - 2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion.
  - 3. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved area within construction limits indicated on Drawings.
  - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
  - 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 31 23 23.13 Backfilling.
  - 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
  - 4. Provide adequate positive drainage, without standing water or ponding.
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.

## TEMPORARY FACILITIES AND CONTROLS

- D. Parking: Provide temporary parking areas for construction personnel in areas shown on the drawings and approved by the RPR.
- E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
  - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
  - 2. Remove snow and ice as required to minimize accumulations.
- F. Project Identification and Temporary Signs: Prepare Project identification and other signs in accordance with the MDOTSHA and MUTCD requirements. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.
  - 1. Provide temporary, directional signs for construction personnel and visitors.
  - 2. Maintain and touchup signs so they are legible at all times.
- G. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal." Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.

## 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
  - 1. Comply with work restrictions specified in Section 01 10 00 Summary.
- B. Temporary Erosion and Sedimentation Control: Comply with requirements specified in Section 31 10 00 Site Clearing.
- C. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Tree and Plant Protection: Protect tree root systems from damage, flooding, and erosion.
- E. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.
- F. Site Enclosure Fence: Not used. Low Profile Barricades shall enclosure the site in a manner that will prevent people, animals and vehicles from easily entering the Project Site.
- G. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar

activities. Provide temporary weathertight enclosure for building exterior.

- J. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
  - 1. Prohibit smoking on the construction site.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

## 3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Operate Project-identification-sign lighting daily from dusk until 12:00 A.M. Continuously monitor and maintain all temporary lighting on barricades and warning signs.
- D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
  - 3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 Closeout Procedures.

END OF SECTION

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# SECTION 01 50 60 CONSTRUCTION INDOOR AIR QUALITY

## PART 1 GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the work of this section.
- B. Coordinate Construction IAQ Plan with independent Commissioning Authority's work and schedule.

## 1.2 RELATED WORK

A. Section 01 10 00 – Summary

## 1.3 SUMMARY

- A. Sections include:
  - 1. References
  - 2. Definitions
  - 3. System description
  - 4. Submittals
  - 5. Quality assurance
  - 6. Low-emitting materials
  - 7. Project conditions
  - 8. Sequence and scheduling
  - 9. System start-up
  - 10. Indoor air quality testing equipment
  - 11. Preparation
  - 12. Indoor air quality
  - 13. Control measures
  - 14. Field quality control

## 1.4 REFERENCES

- A. Other:
  - 1. All publications included by reference in the SUMMARY OF REFERENCED STANDARDS sections and RESOURCES sections of all Credit Sections applicable to this Project, found in the LEED Reference Guide for Green Building Design and Construction, 2009 Edition, along with all errata and addenda released by the US Green Building Council on their website, <u>www.usgbc.org</u>, on or before 1 MAY 2010.

# 1.5 DEFINITIONS

- A. Volatile Organic Compounds (VOCs): are any carbon compounds that participate in atmospheric photochemical reactions (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, and ammonium carbonate).
- B. Type A Finishes: Materials and finishes with potential for short-term levels of off-gassing from chemicals inherent in their manufacturing process, or which are applied in form requiring vehicles or carriers for spreading which release high levels of particulate matter in the process of installation and/ or curing. Including, but not limited to:
- 1. Composite wood products, specifically including particleboard from which millwork, doors, or furniture may be fabricated.
- 2. Adhesives, sealants, and glazing compounds, specifically those with petrochemical vehicles or carriers.
- 3. Wood preservatives, finishes, and paint.
- 4. Control and/ or expansion joint fillers.
- 5. Hard finishes requiring adhesive installation.
- 6. Gypsum board and associated finish processes.
- C. Type B Finishes: Materials and finishes which are woven, fibrous, or porous in nature and tend to absorb chemicals off-gassed by Type A finishes or may be adversely affected by particulates. These materials become "skins" for deleterious substances which may be released much later, or collectors of contaminants that may promote subsequent bacterial growth. Including, but not limited to:
  - 1. Carpet and padding.
  - 2. Insulation exposed to air stream.
  - 3. Acoustic ceiling materials.
  - 4. Tectum acoustic wall panels.
  - 5. Upholstered furnishings.
  - 6. Materials that can be categorized as both Type A and Type B.

#### 1.6 SYSTEM DESCRIPTION

- A. Indoor Air Quality: Minimize air concentrations of certain pollutants in completed project at time of Owner Occupancy. Maximum allowable indoor air concentrations of certain pollutants have been established. Concentrations must be at or below these standards prior to building acceptance.
- B. Indoor Air Quality: Indoor occupied spaces of facility shall comply with the following standards:
  - 1. Carbon Monoxide: Not to exceed 9 PPM + no greater than 2 PPM above outdoor levels.
  - 2. Carbon Dioxide: Not to exceed 800 PPM.
  - 3. Airborne Mold and Mildew: Simultaneous indoor and outdoor readings.
  - 4. Maximum Air Concentration Standards: Indoor room air concentration levels, emission rates and qualities of contaminants shall not exceed the following limits at time of substantial completion prior to occupancy of facility and installation of office furniture, occupants, and occupant activities.

## MAXIMUM INDOOR AIR CONCENTRATION STANDARDS\*

Indoor Contaminants	Maximum Air Concentration Levels
Formaldehyde	50 parts per billion
Total Volatile Organic Compounds (TVOC)	500 micrograms per cubic meter
4-Phenylcyclohexene (4-PCH)**	6.5 micrograms per cubic meter
Total Particulates (PM 10)	50 micrograms per cubic meter
Carbon Monoxide (CO)	9 parts per million and no greater than 2 parts per million above outdoor levels

- \* All levels must be achieved prior to acceptance of the building. The levels do not account for contributions from office furniture, occupants, and occupant activities.
- \*\* 4-phenylcyclohexene is an odorous contaminant constituent in carpets with styrene-butadiene latex rubber (SBR).
- TLV-TWA Threshold Limit Value Time Weighted Average

MERV- Minimum Efficiency Reporting Value (for filtration media)

Or current indoor contaminant levels allowed by the LEED 2009 Rating program.

## 1.7 SUBMITTALS

- A. General: Submit in accordance with Section 01 33 00.
- B. Informational Submittals: Submit the following:
  - 1. A materials log book is required that includes SDS sheets and additional information on chemical content of selected materials, including Volatile Organic Compounds (VOC) in terms of grams per liter (g/L) highlighted showing compliance with specification requirements. This log book shall be maintained by the contractor throughout the life of the project, shall be updated monthly to include any newly approved products, shall be available at all times to the Owner's Representative, and shall be submitted at the conclusion of construction.
  - 2. Indoor Air Quality Plan to outline measures to minimize contamination in the building during construction prior to Owner occupancy.
  - 3. Provide photographs of protected materials, duct sealing and other measures taken at regular intervals throughout the period of construction.
  - 4. Provide Cut Sheets of filtration media used during construction and installed immediately prior to occupancy highlighting MERV values.
  - 5. Coordinate and incorporate all work described herein with construction schedules.
  - Passive Indoor Air Quality Test results.
     Based on results of passive indoor air quality testing, Owner reserves the right to require active indoor air quality testing.
- C. Qualification Data: Indoor Air Quality Consultant's qualification data.
- D. If required, Active Indoor Air Quality Test results.

#### 1.8 QUALITY ASSURANCE

- A. Indoor Air Quality Consultant Qualifications: Owner shall retain services of a recognized independent expert in testing of indoor air quality with access to proper testing equipment, with minimum of five years' experience in testing of indoor air quality.
- B. Regulatory Requirements: Comply with applicable codes, laws, rules, and regulations of authorities having jurisdiction concerning indoor air quality.

#### 1.9 PROJECT CONDITIONS

- A. Environmental Requirements: Comply with requirements of this Section.
- 1.10 SEQUENCE AND SCHEDULING
  - A. General: Sequence and schedule work in accordance with other sections as appropriate.

#### 1.11 SYSTEM START UP

A. Starting of Systems: Coordinate starting of systems with RPR and subcontractor for requirements.

## PART 2 PRODUCTS

## 2.1 INDOOR AIR QUALITY TESTING EQUIPMENT

- A. Passive Testing Equipment: Passive monitoring test kit to measure formaldehyde levels and total VOC levels, list three primary VOCs detected, and identify mold and other particulates collected. Include analysis and written report of tested air.
  - 1. Acceptable Product: IAQ Test Kit, Air Quality Sciences, Atlanta, GA, 770-933-0638.
- B. Active Testing Equipment: As recommended and provided by Air Quality Testing Consultant.

#### PART 3 EXECUTION

- 3.1 PREPARATION
  - A. Indoor Air Quality Plan: Within 30 days of Notice to Proceed, prepare an Indoor Air Quality Plan tailored to the project, to ensure indoor air quality to comply with specified requirements, including but not limited to the following:
    - 1. Identify Type A and Type B finishes in project.
    - 2. Schedule and sequence installation of Type A and Type B finishes.
    - 3. Provide tracking of submittals and SDS sheets that relate to VOC compliance.
    - 4. Describe method, rate, and schedule of ventilation during construction operations.
    - 5. Schedule Indoor Air Quality testing conforming to the requirements of LEED credit EQ3.2 (option 2).
    - 6. Schedule baseline IAQ testing after construction ends and prior to occupancy, using testing protocols consistent with the U.S. Environmental Protection Agency Compendium of Methods for the Determination of Air Pollutants in Indoor Air and as additionally detailed in the LEED for Schools Reference Guide credit EQ3.2 (option 2). RPR's (Construction Manager's) schedule should include this item in project schedule.

#### 3.2 INDOOR AIR QUALITY

- A. General: Schedule and sequence construction and provide ventilation during construction to maximize indoor air quality after occupancy.
  - 1. Schedule and sequence application of finishes to:
    - a. Install Type A Finishes that off-gas significant quantities of deleterious material during curing.
    - b. Ensure dissipation of emissions from Type A finishes before installation of Type B Finishes.
    - c. Install Type B Finishes (absorptive materials).
    - d. Avoid absorption of Type A Finish emissions by Type B Finishes.
    - e. All absorptive materials either stored on site or installed shall be
    - protected from moisture throughout the course of construction.f. Avoid subsequent release of unwanted substances in indoor spaces and
      - mechanical systems after facility occupancy.
- B. Temporary Heating and Ventilating: Comply with Section 01 50 00 –Construction Facilities and Temporary Controls.

#### 3.3 CONTROL MEASURES

- A. HVAC PROTECTION: All HVAC equipment shall be protected from collecting not only dust but also odors which can "stick" to porous materials in the system and later be released. Specific HVAC protection requirements generally apply to either the return side, central filtration, or supply side of the system. Identify in the Indoor Air Quality plan the methods to be utilized for HVAC protection.
  - 1. Return Side: The return side of an HVAC system is, by definition, under negative pressure and thus capable of drawing in nearby construction dust and odor. HVAC shall not be used by the Contractor during construction period.
    - a. The entire system shall be shut down during all construction activities unless otherwise agreed to by the RPR and the Commissioning Agent.
    - b. The system shall be isolated from the surrounding environment as much as possible (e.g., all tiles in place for a ceiling plenum, duct and air handler leaks repaired) to prevent induction of pollutants.
    - c. All return system openings in (or immediately adjacent to) the construction area shall be sealed with plastic.
    - d. The mechanical room shall not be used to store construction or waste materials.
  - 2. Central Filtration: Where major dust loading is expected to impact operating HVAC systems, upgrade filter efficiency. For example, filters with 60 to 80% dust spot efficiency may provide increased protection, if minimum airflow can be maintained. Where other control options for construction related odors are not deemed effective, provide filtration with media such as activated charcoal or potassium permanganate.
  - 3. Supply Side: Diffusers, VAV boxes, and ducts may be adequately protected in most cases where the above measures are implemented. When the system is off for the duration of construction, diffusers and window units shall also be sealed in plastic for further protection. Ducts, diffusers, and window units shall be inspected upon completion of the work for the amount of deposited particulate resent and cleaned. If significant dust deposits are observed in the system during construction, some particulate discharge can be expected during start-up. When such a discharge is only minor, delaying occupancy only long enough to clean up the dust. In more severe cases, install temporary coarse filters on diffusers or clean the ducts. The condition of the main filters shall be checked whenever visible particulates are discharged from the system or as directed by the RPR.
  - 4. Duct Cleaning: Clean the ducts and associated equipment during construction when the system becomes contaminated due to inadequate protection during the construction process. Provide specialized equipment and professional expertise as needed to ensure that dust is effectively removed and contained to the satisfaction of the RPR and the Commissioning Agent. The sequence in which duct cleaning occurs in the overall construction process needs to be carefully considered to avoid recontamination.
- B. SOURCE CONTROL: The most effective type of pollution control is generally at the source. A variety of options are available depending on the type of products and equipment needed for the construction project. When any of the following control options appear to be feasible, costs should be compared to other measures (pathway interruption, intensified housekeeping, and scheduling changes) during the construction project. Although solvent content is often reduced, air quality advantages may be limited (e.g., most paints and adhesives stop significant off-gassing within a few weeks anyway). Product emission data is available from manufacturers and can be stated either as total VOCs or by specific compound. The time period of the testing is important (emissions should be expected to decline). Identify in the Indoor Air Quality plan source control methods to be utilized.
  - 1. Modifying Equipment Operation: Use of equipment may need to be restricted in order to meet IAQ objectives. This will involve changing operating procedures. Examples of such controls include:

- a. Restricting traffic volume or prohibiting idling of motor vehicles where emissions could be drawn into occupied areas.
- b. Switching from diesel to bottled gas for equipment such as generators of forklifts (emissions are cleaner but still potentially harmful under some circumstances). Use of electric forklifts and other equipment shall be considered when feasible, since they do not burn fossil fuels, thus eliminating exposure to combustion gas emissions.
- c. Switching equipment such as chain saws from gasoline-powered to electric (job may take longer due to reduced performance).
- d. Cycling equipment off when not needed.
- 2. Changing Work Practices:
  - a. For some tasks (e.g., paint stripping) provide techniques which produce less airborne dust.
  - b. Provide painting techniques, which release less odor.
  - c. Provide cleaning practices which raise less dust (see Section 3.03.D.3).
- 3. Local Exhaust: Pollution sources shall be directly exhausted to the outside. This shall be done through a portable exhaust fan vented to the outside and attached to the work site by flex duct. Depending on the nature of the material and the location of the exhaust, special filtration of the exhaust may or may not be necessary. Any emissions to the outside must be in compliance with applicable regulations and shall be directed well away from intakes.
- 4. Air cleaning: Where exhaust is not feasible, local recirculation of air through a portable air cleaner shall be provided. The type of filter shall be suitable for the material being controlled (e.g., charcoal or potassium permanganate for many odors, a moderate to high efficiency filter for dust).
- 5. Cover or Seal: VOC emissions are a result of evaporation from an exposed surface. Reducing the exposed surface reduces emissions. Provide the following measure including but not limited to:
  - a. An enclosed tanker or closed/ hooded kettle for roofing.
  - b. Containers of wet products shall be kept closed as much as possible.
  - c. Waste materials which can release odor or dust shall be covered or sealed.
  - d. A surface which is a persistent odor source shall be controlled by applying a sealer.
- C. PATHWAY INTERUPTION: Provide methods that prevent and interrupt potential contaminant pathways and air movement from the work site. Identify in the Indoor Air Quality plan major pathways for the project. In the Indoor Air Quality Plan utilize the following five different factors to achieve environmental control:
  - 1. Depressurize the work area. This shall be accomplished by adjusting the balance of the HVAC and exhaust systems or installing portable exhaust fans. Construction worker comfort may have to be a secondary consideration when cutting off conditioned air to the work site becomes necessary to help establish negative pressure environment. Some ventilation of the construction space will still be needed to dilute contaminants. This may be provided by air drawn into the work site from adjoining areas. Air exhausted to achieve negative pressure may or may not need to be filtered, depending on the nature of the materials, location of exhaust, and any applicable regulations. Care must be taken not to exhaust air where it can be drawn back into the building. When increasing the amount of air supplied to the space, it is imperative that the HVAC system itself remains protected from construction emissions. As a general rule, the work site shall be exhausted at a rate at least 10% greater than the rate of supply in order to maintain an effective negative pressure.
  - 2. *Pressurize occupied space.* Increasing supply air and or reducing return exhaust air in the building during construction will help exclude airborne dust and odors. While HVAC systems generally shut down at night, consideration shall be given to temporarily extending the fan schedule. Overnight pressurization could help

prevent dust and odor from migrating into the space. When increasing the amount of air supplied to the occupied space, it is imperative that the HVAC system itself remains protected from construction emissions. Any temporary rebalancing during construction should be carefully planned with the Commissioning Agent and executed.

- 3. *Erect barriers to contain construction area.* Barriers can range from simple dust curtains for jobs generating only minor amounts of nuisance dust to a continuous plastic seal around the site, allowing for only the controlled inflow of make-up air. For non-asbestos projects, the extent of the barrier should be based on the materials involved and the implications of dust and odor escaping from the site. Id such a release is not considered a hazard and can be easily corrected by housekeeping, then a partial barrier or sealing of holes may be sufficient. Where no odor or dust can be tolerated outside the work area, a barrier approaching that required for asbestos projects may be needed. Barriers shall be designed in conjunction with favorable pressure differentials. Pressurization can only be achieved with a real partition between areas with pressure differences. In general, full containment of a work site with barriers, capping of return air ducts, and the application of negative pressure may be needed for spaces undergoing significant construction activities, and requirements shall be as directed by the Owner's Representative.
- 4. *Relocate pollutant sources.* When project equipment of staging area coincide with critical airflow pathways equipment shall be moved to a more favorable location in regard to air quality. For example, in a roofing job, tar tankers shall be located as far away from intakes as possible. Special care shall be taken to protect mechanical rooms with air handling equipment (e.g., store construction products and waste materials elsewhere).
- 5. *Temporarily seal the building.* Where construction emissions are occurring on the roof or adjacent to a building, contaminants may be drawn in through the outside air intake or (if the building is under negative pressure) other entries or cracks. If contaminant levels are unacceptable then the RPR or the Commissioning Agent shall direct the Contractor to seal the intake dampers. Special activities in the building that require outside air for dilution shall be temporarily discontinued. Control of the outside source may also necessitate closing or sealing exterior doors, the top of the elevator shaft, etc.
- D. HOUSEKEEPING: As dust accumulates at a construction site, it will become airborne when disturbed by nearby activity. Similarly, spills or excess applications of products containing solvents will increase odors at a construction site. Finally, leaving the work site wet or even just damp for more than a day could result in the growth of mold and bacteria. Attention to site cleaning is, therefore, important to maintaining IAQ during construction. In the Indoor Air Quality Plan utilize these specific actions in regard to controlling contaminants at the work site including but not limited to:
  - 1. Suppressing dust with wetting agents or sweeping compounds.
  - 2. Increasing the cleaning frequency for dust.
  - 3. Switching to a more efficient dust collection method (e.g., a damp rag, wet mop, or vacuum equipped with a high efficiency particulate filter or wet scrubber will discharge less material back into the air than conventional vacuuming, sweeping, or dusting).
  - 4. Ensuring that all surfaces (including higher ledges, behind furniture, and inside mechanical equipment) are kept clean.
  - 5. Removing spills or excess applications of solvent-containing products as soon as possible. Care shall be taken as to the selection of spot removers and cleaning agents (in general, products should be low odor emitters or used after hours with sufficient ventilation).
  - 6. Removing accumulated water and keeping work areas as dry as possible (using dehumidification if necessary).
  - 7. Vacuuming with HEPA filtered vacuum cleaners prevents aerolization of settled dust.

- 8. Protecting porous materials such as insulation from exposure to moisture (note: items which become wet/ damp will be replaced)
- E. SCHEDULING: In the Indoor Air Quality Plan utilize construction sequencing to reduce absorption of VOCs by materials that act as sinks or contaminant sources. Complete application of wet and odor-emitting materials such as paints, sealants, and coatings before installing sink materials such as ceiling tiles, carpets, insulation, gypsum products, and fabric covered furnishings are installed. Materials directly exposed to moisture through precipitation, plumbing leaks, or condensation from HVAC system are susceptible to microbial contamination and shall be replaced at no additional cost to the Owner. Contractor shall conduct activities with a high pollution potential during off hours. For example, if roofing emissions cannot be excluded from the building, the work shall be performed on an evening shift. Similarly, any work which disrupts the HVAC system or introduces odor into the system shall be done during unoccupied hours when possible. Where off-gassing odors are a major concern, work may have to be completed at the beginning of a weekend in order to allow new products time to air out sufficiently. Where occupants cannot be relocated, starting time may need to be delayed until late morning in order to accommodate clean-up of late-night construction work.

The above measures assume that construction work is being rescheduled in order to avoid potentially harmful exposure to the general population.

F. At the end of the construction and prior to Owner occupancy, conduct air quality testing in full compliance with the requirements of LEED credit EQ3.2 (option 2).

## 3.4 FIELD QUALITY CONTROL

- A. Indoor Air Quality Testing Conditions: Facility has achieved Substantial Completion except for indoor air quality testing.
  - 1. Final Cleaning: Completed.
  - 2. HVAC Systems: Started, tested, balanced, Commissioned, cleaned, construction filters replaced and systems operating normally as specified.
  - 3. Facility: Not occupied and Owner provided furnishings and equipment not yet installed.
- B. BASELINE IAQ TESTING:
  - 1. HVAC System Verification: To assure compliance with recognized standards for indoor air quality including ASHRAE Standard 62-1999 or latest version, the Owner's independent testing and balancing agency shall verify the performance of each HVAC system including but not limited to space temperature and space humidity uniformity, outside air quantity, filter installation, drain pan operation, and any obvious contamination sources.
  - 2. Indoor Air Quality Testing: Upon verification of HVAC system operation, the independent Air Quality Testing Consultant shall test levels of indoor air contaminants for compliance with specified requirements.
    - a. A Test plan shall be submitted for the approval of the RPR. The plan shall specify procedures, times, instrumentation, and sampling methods that will be employed.
    - b. The number of sampling locations will vary depending upon the size of the building. Contaminant levels are to be measured in an area agreed upon by the Contractor and the Owner's Representative.
    - c. Collect air samples on three consecutive days during normal school hours (between the hours of 8:00 am and 3:00 pm) with building operating at normal HVAC rates. Average the results of each three-day tests cycle to determine compliance or non-compliance of indoor air quality for each air-handling zone tested.
    - d. Sample and record outside air levels of formaldehyde and contaminants at outside air intake of each respective air handling unit simultaneously

with indoor tests to establish basis of comparison for these contaminant levels. Indoor testing will be done in the breathing zone; between 4' and 7' from the floor.

- e. Acceptance of respective portions of buildings by the Owner is subject to compliance with specified limits of indoor air quality contaminant levels.
- C. Passive Indoor Air Quality Testing: Provide and install Passive Indoor Air Quality Testing Equipment in space to be occupied as directed by RPR and in accordance with testing equipment manufacturer's recommendations.
  - 1. Conduct passive test for 7 days with facility operating at specified HVAC rates and conditions.
  - 2. Include analysis and written report of tested air by testing equipment provider.
  - 3. If initial test results do not indicate compliance with specified indoor air quality standards, provide additional ventilation and take additional measures as required and accepted by Owner to achieve compliance.
  - 4. Cost of Subsequent Passive Testing required because of failure to comply with specified standards shall be the responsibility of the Contractor.
- D. Active Indoor Air Quality Testing: After results of passive testing have been submitted, Owner retains the right to require active indoor air quality testing by Air Quality Testing Consultant.
  - 1. Testing: As determined by Owner based on recommendations of Air Quality Testing Consultant.
  - 2. Cost of Initial Active Testing: By Owner
  - 3. If initial test results do not indicate compliance with specified indoor air quality standards, provide additional ventilation and take additional measures as required and accepted by Air Quality Testing Consultant to achieve compliance.
  - 4. Cost of Subsequent Active Testing Required Because of Failure to Comply with Specified Standards: By Contractor.
- E. Compliance: Indoor air quality shall conform to paragraph 1.06 above.
- F. Test Reports: Prepare test reports showing the results and location of each test, a summary of the HVAC operating conditions, a listing of any discrepancies and recommendations for corrective actions, if required.
  - 1. Include certification of test equipment calibration with each test report.
- G. If any test fails the standard, the Contractor is responsible to ventilate the building with 100% outside air until the building passes both air quality tests and duct inspections. Retesting shall be performed at no additional expense to the Owner.

## END OF SECTION

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## SECTION 01 54 60 SAFETY AND HEALTH

PART 1 GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. Code of Federal Regulations (CFR):
  - 1. OSHA General Industry Safety and Health Standards (29 CFR 1910), Publication V2206; OSHA Construction Industry Standards (29 CFR 1926).
  - 2. National Emission Standards for Hazardous Air Pollutants (40 CFR, Part 61).
  - 3. Environmental Protection Agency (EPA) Final Rule (40 CFR Part 761) dated July 17, 1985.
- C. Federal Standard (Fed. Std):
  1. 313A Material Safety Data Sheets, Preparation and the Submission of.
- D. Maryland Standards:
   1. Maryland Occupational Safety and Health (MOSH) Supplement to OSHA.

#### 1.3 WORK COVERED BY THIS SECTION

- A. This section is applicable to all work.
- B. A Site-Specific Safety and Health Plan is to be developed by the Contractor and shall be adhered to in the execution of the work. The Plan shall include an overview of procedures, reports and samples of forms and documents for the plan. The contractor shall provide a copy of his safety plan to the RPR.

## 1.4 DEFINITION OF HAZARDOUS MATERIALS

A. Refer to hazardous and toxic materials/substances included in Subparts H and Z of 29 CFR 1910; and to others as additionally defined in Fed. Std. 313. Those most commonly encountered include asbestos, polychlorinated biphenyls (PCB's), explosives, and radioactive material, but many include others. The most likely products to contain asbestos are sprayed-on fireproofing, insulation, boiler lagging, pipe covering and likely products to contain PCB's are transformers, capacitors, voltage regulators, and oil switches.

#### 1.5 QUALITY ASSURANCE

A. Safety Meeting: Representatives of the Contractor shall meet with the Owner and his/her representative(s) prior to the start of work under this contract for the purpose or reviewing the Contractor's safety and health programs and discussing implementation of all safety and health provisions pertinent to the work to be performed under the contract. The Contractor shall be prepared to discuss in detail, the measures he/she intends to take in order to control any unsafe or unhealthy conditions associated with the work to be performed under the contract. If directed by the Owner, this meeting may be held in conjunction with other meetings which are scheduled to take place prior to start of work under this contract. The level of detail for the safety meeting is dependent upon the nature of the work and the potential inherent hazards. The Contractor's principal on-site representative(s), the general superintendent and his/her safety representative(s) shall attend this meeting.

- B. Compliance with Regulations: All work, including contact with and handling of hazardous materials, the disturbance or dismantling of structures containing hazardous materials and/or the disposal of hazardous materials shall comply with the applicable requirements of 29 CFR 1926/1910 and 40 CFR 761. All work shall comply with applicable state and municipal safety and health requirements. Where there is a conflict between applicable regulations, the most stringent shall apply.
- C. Contractor Responsibility: The Contractor shall assume full responsibility and liability for compliance with all applicable regulations pertaining to the health and safety of personnel during the execution of work and shall hold the Owner harmless for any action on his/her part or that of his/her employees or subcontractors, which results in illness, injury or death.
- D. Contractor shall conduct activities in a safe manner and shall be responsible for observing the safety regulations of MOSH, OSHA, and local life safety agencies.
  - 1. Comply with all applicable laws, ordinances, rules, regulations, and orders of the governing authorities having jurisdiction for safety of persons and property to protect them from damage, injury, or loss.
  - 2. Erect and maintain as required by conditions and progress of the work all necessary safeguards for safety and protection, including fences, railings, barricades, lighting, posting of danger signs, and other warnings against hazards.
  - 3. Be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with this project.
  - 4. Contractor shall immediately provide and maintain properly secured and labeled temporary protective covers over all deck and roof penetrations and openings until permanent work is installed.
- E. Contractor shall furnish any and all relevant SDS (Safety Data Sheets) information as related to their scope of work prior to starting. If not on file, this Contractor will not be permitted to work. Resulting delays and associated cost shall be the responsibility of this Contractor including costs incurred by other parties.
- F. The General Contractor will require all contractors to complete a "Permit to Work" for high risk activities such as: crane erection and dismantling, entry into confined spaces, hot works, works on or adjacent to energized systems, and work on occupied premises. The Contractor shall present a Job Hazard Analysis and safe work method statement prior to the issuance of a Permit to Work. These items will be required in the project specific safety plan required for all Contractors.
- G. All Contractors acknowledge that safety harnesses must only be used as a secondary means of fall prevention / fall restraint or as a last resort when no other practical means are available to provide a safe method of work. Passive fall protection such as safe work platforms, scaffolding, robust perimeter protection, and Mobile Elevated Work Platforms must be used wherever possible to prevent the use of safety harnesses as a primary means of fall protection.
- H. Contractor shall conduct weekly tool box safety meetings and shall require all of their employees working on the site to attend. Copies of the minutes and attendance sheet must be submitted to the General Contractor weekly.
- I. All Contractors shall provide proof of training and certification for all employees assigned to this project. Training must be relevant and updated for the scope of work or equipment being performed or operated by the individual tradesmen.
- J. Contractor acknowledges that all employees are required to wear shirts, work shoes, and hard hats, safety glasses and high visibility vest at all times while on site. No shorts will be permitted.
- K. Contractors shall install and maintain safety fence at all open excavations that they create.

- L. Contractor shall exercise due care and shall be responsible for all material and accessories required for the safe rigging and handling of material and equipment so as to provide for the safety of persons and property, the work of other trades, and material and equipment stored at the jobsite.
- M. Contractor shall replace any safety handrails and barriers taken down or removed during the process of their work.
- N. Safety shall be a standing discussion item at the Construction Progress Meeting.
- O. Site-Specific Safety and Health Plan: The Contractor's Safety and Health Plan is to be submitted for approval during the initial submittals for the project upon receipt of Notice to Proceed.
- P. Accident Reporting: A copy of each accident report, which the Contractors or subcontractors submit to their insurance carriers, shall be forwarded to the Owner as soon as possible, but in no event later than seven (7) calendar days after the day the accident occurred.
- Q. Permits: If hazardous materials are disposed of off-site, submit copies of permits from applicable, Federal, state or municipal authorities and necessary certificates that the material has been disposed of as per regulations.
- R. Other Submittals: If agreed to in writing at the safety meeting, other submittals shall be required. One such submittal which may be included is a plan of action for handling hazardous materials, which shall contain the following:
  - a. Number, type, and experience of employees to be used for the work
  - b. Description of how applicable safety and health regulations and standards are to be met.
  - c. Type of protective equipment and work procedures to be used
  - d. Emergency procedures for accidental spills or exposures
  - e. Procedures for disposing of or storing the toxic/hazardous materials
  - f. Identification of possible hazards, problems, and proposed control mechanisms
  - g. Protection of public or others not related to the operation
  - h. Interfacing and control of subcontractors, if any
  - i. Identifications of any required analyses, test demonstrations, and validation requirements.
  - j. Method of certification for compliance

#### PART 2 PRODUCTS

#### 2.1 MATERIALS AND EQUIPMENT

A. Special facilities, devices, equipment, clothing, and similar items used by the Contractor in the execution of work shall comply with the applicable regulations.

#### PART 3 EXECUTION

- 3.1 GENERAL
  - A. Material Safety Data Sheets: Safety Data Sheets (SDS) shall be kept on file in the Contractor's Field Office and made available for review when required.

#### 3.2 SAFETY AND HEALTH PLAN

A. Site-Specific Safety and Health Plan: Post copies of the plan in conspicuous location so that all personnel may be made aware of the safety procedures at all times.

#### 3.3 STOP WORK ORDERS

A. When the Contractors or his/her subcontractors are notified by the Owner/Architect of any noncompliance with the provisions of the contract and the action(s) to be taken, the Contractor shall immediately, if so directed, or within 48 hours after receipt of a notice of violation correct the unsafe or unhealthy condition. If the Contractor fails to comply promptly, all or any part of the work being performed may be stopped by the Owner/Architect with a "Stop Work Order". When, in the opinion of the Owner/Architect, satisfactory corrective action has been taken to correct the unsafe and unhealthy condition, a start order will be given immediately. The Contractor shall not be allowed any extension of time or compensation for damages by reason of or in connection with such work stoppage.

## 3.4 **PROTECTION**

- A. The Contractor shall take all necessary precautions to prevent injury to the public, or damage to property of others. For the purposes of this contract, the public shall include all persons not employed by the Prime Contractor's or a subcontractor working under his/her direction.
- B. Storing, positioning or use of equipment, tools, materials, scraps, and trash in a manner likely to present a hazard to the public by its accidental shifting, ignition, or other hazardous qualities is prohibited.
- C. Public Thoroughfare: When work is to be performed over a public thoroughfare such as a sidewalk, the thoroughfare shall be closed, if possible, or other precautions taken such as the installation of screen or barricades. When the exposure to heavy falling objects exists, as during the erection of building walls, special protection of the type detailed in 29 CFR 1910/1926 shall be provided.
- D. Fences and barricades shall be removed upon completion of the project, in accordance with local ordinance and to the satisfaction of the General Contractor.

## END OF SECTION

## SECTION 01 60 00 PRODUCT REQUIREMENTS

## PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for Contractor requirements related to Owner-furnished products.
  - 2. Section 012300 "Alternates" for products selected under an alternate.
  - 3. Section 014200 "References" for applicable industry standards for products specified.
  - 4. Section 01770 "Closeout Procedures" for submitting warranties.

## 1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
  - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, inservice performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.

- 1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
  - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
  - 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."

## 1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
  - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
  - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or poweroperated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
    - a. Name of product and manufacturer.
    - b. Model and serial number.
    - c. Capacity.
    - d. Speed.
    - e. Ratings.

3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

## 1.5 COORDINATION

A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

## 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

# 1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

- 1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
- 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
  - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

## PART 2 - PRODUCTS

## 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
  - 4. Where products are accompanied by the term "as selected," RPR/Architect will make selection.
  - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
  - 6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
    - a. Submit additional documentation required by RPR/Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the RPR/Architect, whose determination is final.
- B. Product Selection Procedures:

- 1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
- 2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
- 3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
  - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
- 4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
  - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
  - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
- 5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
  - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
- 6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
  - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
  - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.

- 7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
- E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.
  - 1. Select products for which sustainable design documentation submittals are available from manufacturer.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: RPR/Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
  - 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
  - 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
  - 3. Evidence that proposed product provides specified warranty.
  - 4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
  - 5. Samples, if requested.
- B. RPR/Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 013300 "Submittal Procedures."
  - 1. Form of Approval of Submittal: As specified in Section 013300 "Submittal Procedures."

- 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Two-Step Process: Approval by the RPR and Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.
- D. Submittal Requirements, Single-Step Process: When acceptable to RPR and Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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# SECTION 01 73 00 EXECUTION

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of Owner's portion of the Work.
  - 6. Coordination of Owner-installed products.
  - 7. Progress cleaning.
  - 8. Starting and adjusting.
  - 9. Protection of installed construction.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for coordination of Owner-furnished products, and limits on use of Project site.
  - 2. Section 013300 "Submittal Procedures" for submitting surveys.
  - 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
  - 4. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.

#### 1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

### 1.4 PREINSTALLATION MEETINGS

- A. Cutting and Patching Conference: Conduct conference at Project site.
  - 1. Prior to submitting cutting and patching plan, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform RPR of scheduled meeting. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:
    - a. Contractor's superintendent.
    - b. Trade supervisor responsible for cutting operations.
    - c. Trade supervisor(s) responsible for patching of each type of substrate.
    - d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.
  - 2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- B. Layout Conference: Conduct conference at Project site.
  - 1. Prior to establishing layout of new and existing perimeter and structural column grid(s), review building location requirements. Review benchmark, control point, and layout and dimension requirements. Inform RPR of scheduled meeting. Require representatives of each entity directly concerned with Project layout to attend, including the following:
    - a. Contractor's superintendent.
    - b. Professional surveyor responsible for performing Project surveying and layout.
    - c. Professional surveyor responsible for performing site survey serving as basis for Project design.
  - 2. Review meanings and intent of dimensions, notes, terms, graphic symbols, and other layout information indicated on the Drawings.
  - 3. Review requirements for including layouts on Shop Drawings and other submittals.
  - 4. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certified Surveys: Submit two copies signed by land surveyor.
- C. Certificates: Submit certificate signed by land surveyor, certifying that location and elevation of improvements comply with requirements.
- D. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
  - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.

- 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
- 3. Products: List products to be used for patching and firms or entities that will perform patching work.
- 4. Dates: Indicate when cutting and patching will be performed.
- 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
  - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- E. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

## 1.6 CLOSEOUT SUBMITTALS

A. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

## 1.7 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Professional Engineer Qualifications: Refer to Section 014000 "Quality Requirements."
- C. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect, through RPR, of locations and details of cutting and await directions from RPR before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Plumbing piping systems.
    - f. Mechanical systems piping and ducts.

- g. Control systems.
- h. Communication systems.
- i. Fire-detection and -alarm systems.
- j. Conveying systems.
- k. Electrical wiring systems.
- 1. Operating systems of special construction.
- m. Security systems (employees, passenger screening and baggage screening)
- 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
  - a. Water, moisture, or vapor barriers.
  - b. Membranes and flashings.
  - c. Exterior curtain-wall construction.
  - d. Sprayed fire-resistive material.
  - e. Equipment supports.
  - f. Piping, ductwork, vessels, and equipment.
  - g. Noise- and vibration-control elements and systems.
- 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in RPR/Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

## PART 2 - PRODUCTS

## 2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
  - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to RPR/Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

- C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - 1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
  - 2. List of detrimental conditions, including substrates.
  - 3. List of unacceptable installation tolerances.
  - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

#### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to RPR in accordance with requirements in Section 013100 "Project Management and Coordination."

## 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify RPR promptly.
- B. Engage a land surveyor experienced in laying out the Work but not involved in the Project Design, using the following accepted surveying practices:
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish limits on use of Project site.
  - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 4. Inform installers of lines and levels to which they must comply.
  - 5. Check the location, level and plumb, of every major element as the Work progresses.
  - 6. Notify RPR when deviations from required lines and levels exceed allowable tolerances.
  - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and

duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by RPR.

## 3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
  - 1. Do not change or relocate existing benchmarks or control points without prior written approval of RPR. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to RPR before proceeding.
  - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
  - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
  - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
  - 2. Building Show building lines, column lines, building corners, floor elevations, roof lines and elevations.
  - 3. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

### 3.5 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure satisfactory results as judged by RPR. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by RPR.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by RPR. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

## 3.6 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of Work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as

practicable, as judged by RPR/Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.

- 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
- 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
  - b. Restore damaged pipe covering to its original condition.
- 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
- 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
- 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

## 3.7 COORDINATION OF OWNER'S PORTION OF THE WORK

- A. Site Access: Provide access to Project site for Owner's construction personnel.
  - 1. Provide temporary facilities required for Owner-furnished, Contractor-installed products.
  - 2. Refer to Section 011000 "Summary" for other requirements for Owner-furnished, Contractor-installed products
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
  - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
  - 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend

preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

## 3.8 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
  - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
  - 5. Recycle materials in accordance with Section 01 74 19 "Construction Waste Management and Disposal".
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal.".
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

## 3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with Airport Maintenance and RPR.
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

#### 3.10 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- D. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

## SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND

## DISPOSAL PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous demolition and construction waste.
  - 2. Recycling nonhazardous demolition and construction waste.
  - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
  - 1. Section 041000 "Unit Masonry Assemblies" for disposal requirements for masonry waste.
  - 2. Section 311000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

#### 1.3 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

#### 1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

## 1.5 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 14 days of date established for the Notice to Proceed.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For waste management coordinator and refrigerant recovery technician.
- B. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- C. Refrigerant Recovery: Comply with requirements in Section 024119 "Selective Demolition" for refrigerant recovery submittals.

## 1.7 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.
- B. Refrigerant Recovery Technician Qualifications: Comply with requirements in Section 024119 "Selective Demolition."
- C. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

## PART 2 - PRODUCTS

#### 2.1 RECYCLING RECEIVERS AND PROCESSORS

A. Subject to compliance with requirements, available recycling receivers and processors include, but are not limited to, the following:

1. Republic Services 11710 Greencastle Pike, Hagerstown MD 21740 (301)223-7272

## PART 3 - EXECUTION

#### 3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
  - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
  - 2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.
- E. Waste and Recycling Removal: Waste shall be removed from site periodically, but at no greater interval than weekly. Contractor shall remove waste and recycling at increased intervals as directed by the RPR.

#### 3.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  - 2. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

# 3.3 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.
  - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
  - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Paint: Seal containers and store by type.

# 3.4 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner's property.
- C. Burning: Do not burn waste materials.

D. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

END OF SECTION 017419

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# SECTION 01 77 00 - CLOSEOUT

# PROCEDURES PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
- B. Related Requirements:
  - 1. Section 012900 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.
  - 2. Section 013233 "Photographic Documentation" for submitting Final Completion construction photographic documentation.
  - 3. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
  - 4. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 5. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.
  - 6. See Divisions 02 through 34 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

## 1.3 DEFINITIONS

A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

#### 1.4 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest-control inspection.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

## 1.7 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by RPR. Label with manufacturer's name and model number.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain RPR's signature for receipt of submittals.
  - 5. Submit testing, adjusting, and balancing records.
  - 6. Submit sustainable design submittals not previously submitted.
  - 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Advise Owner of pending insurance changeover requirements.
  - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  - 3. Complete startup and testing of systems and equipment.
  - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
  - 6. Advise Owner of changeover in utility services.
  - 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  - 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  - 9. Complete final cleaning requirements.
  - 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect and RPR will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
  - 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  - 2. Results of completed inspection will form the basis of requirements for Final Completion.

## 1.8 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
  - 1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
  - 2. Certified List of Incomplete Items: Submit certified copy of Architect and RPR's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by both Architect and RPR. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  - 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  - 4. Submit pest-control final inspection report.
  - 5. Submit Final Completion photographic documentation.

- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect and RPR will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
  - 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

## 1.9 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  - 1. Organize list of spaces in sequential order, starting with exterior areas first, listed by room or space number.
  - 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
  - 3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect and RPR.
    - d. Name of Contractor.
    - e. Page number.
  - 4. Submit list of incomplete items in the following format:
    - a. MS Excel Electronic File: Architect and RPR will return annotated file.

## 1.10 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of RPR and Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  - 1. Submit on digital media acceptable to RPR and Architect.

- E. Warranties in Paper Form:
  - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- F. Provide additional copies of each warranty to include in operation and maintenance manuals.

#### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

## PART 3 - EXECUTION

## 3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural

weathering of exterior surfaces. Restore reflective surfaces to their original condition.

- g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- h. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
- i. Vacuum and mop concrete.
- j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain. If soil or stains cannot be removed to Owner or RPR approval, replace carpeted areas stained or soiled by construction activities.
- k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
- 1. Remove labels that are not permanent.
- m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- p. Clean ducts, blowers, and coils that display contamination with particulate matter on inspection.
  - 1) Clean HVAC system in compliance with NADCA ACR. Provide written report on completion of cleaning.
- q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
- r. Clean strainers.
- s. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste-disposal requirements in Section 017419 "Construction Waste Management and Disposal."

## 3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations required by Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700

# SECTION 01 78 20 OPERATION AND MAINTENANCE DATA

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Emergency manuals.
  - 2. Operation manuals for systems, subsystems, and equipment.
  - 3. Maintenance manuals for the care and maintenance of products, materials, and finishes; systems and equipment.
- B. See Divisions 02 through 34 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

#### 1.2 SUBMITTALS

- A. Manual: Submit one copy of each manual in final form at **mid-point of construction**. RPR will return copy with comments within 15 days.
  - 1. Correct or modify each manual to comply with RPR's comments and re-submit for approval. RPR will approve or return copy with additional comments within 15 days. Submit three (3) copies of each corrected and approved manual 15 days before the scheduled Substantial Completion and before demonstrations.
  - 2. Substantial Completion shall not occur until approved manuals are in the possession of the Owner and RPR.
  - 3. Any delays created by the Contractor in submittal approved manuals to the Owner and RPR may determine the impact of the schedule project delivery.

#### PART 2 - PRODUCTS

#### 2.1 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain a title page, table of contents, and manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Owner.
  - 4. Date of submittal.
  - 5. Name, address, and telephone number of Contractor.
  - 6. Name and address of RPR.
  - 7. Name and address of Architect.
  - 8. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions

#### **OPERATION AND MAINTENANCE DATE**

for subsystems, equipment, and components of one system into a single binder.

- Binders: Heavy-duty, 'D' 3-ring, clear-vue, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine and cover to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
  - a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project name, project number, subject matter of contents, and date of Substantial Completion. Indicate volume number for multiple-volume sets.
- 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross- referenced to Specification Section number and title of Project Manual.
- 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
- 4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.
- D. Digital Contents: Provide the required information above in PDF file format for the Owner's exclusive use.

#### 2.2 EMERGENCY MANUALS

1.

- A. Content: Organize manual into a separate section for type of emergency, emergency instructions, and emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component for fire, flood, gas leak, water leak, power failure, water outage, equipment failure and chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include instructions on stopping, shutdown instructions for each type of emergency, operating instructions for conditions outside normal operating limits, and required sequences for electric or electronic systems.

#### 2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and equipment descriptions, operating standards, operating procedures, operating logs, wiring and control diagrams, and license requirements.
- B. Descriptions: Include the following:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Equipment identification with serial number of each component.
  - 4. Equipment function.
  - 5. Operating characteristics.

- 6. Limiting conditions.
- 7. Performance curves.
- 8. Engineering data and tests.
- 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include start-up, break-in, and control procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; and required sequences for electric or electronic systems.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

#### 2.4 PRODUCT MAINTENANCE MANUAL

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and inspection procedures, types of cleaning agents, methods of cleaning, schedule for cleaning and maintenance, and repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

#### 2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

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- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including maintenance instructions, drawings and diagrams for maintenance, nomenclature of parts and components, and recommended spare parts for each component part or piece of equipment.
- D. Maintenance Procedures: Include test and inspection instructions, troubleshooting guide, disassembly instructions, and adjusting instructions, and demonstration and training videotape if available, that detail essential maintenance procedures:
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

## PART 3 - EXECUTION

- 3.1 MANUAL PREPARATION
  - A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
  - B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
  - C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
    - 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
  - F. Comply with Section 01 77 00 for schedule for submitting operation and maintenance documentation.

## END OF SECTION

# SECTION 01 78 39 PROJECT RECORD DOCUMENTS

## PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Record Samples.
  - 5. Record Schedule.
  - 6. Miscellaneous Record Submittals.
  - 7. Computer Aided Design and Drafting (CADD) requirements for Record Drawings.
- B. Related Requirements:
  - 1. Division 01 Section "Construction Progress Documentation" for construction schedules as basis for Record Schedule.
  - 2. Division 01 Section "Quality Requirements" for ensuring the record drawings and specifications are kept current on a daily basis and marked to show deviations which have been made from the original Contract documents.
  - 3. Section 017300 "Execution" for final property survey.
  - 4. Section 017700 "Closeout Procedures" for general closeout procedures.
  - 5. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set(s) of marked-up record prints within 30 days of Final Completion.
- B. Record Specifications: Submit annotated PDF electronic files and two paper copies of Project's Specifications, including addenda and Contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories and one paper copy of each submittal.

- 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as Record Product Data.
- D. Record Samples: Submit Record Samples as specified.
- E. Record Schedule: Submit three copies of Record Schedule.
- F. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous recordkeeping requirements and submittals in connection with various construction activities. Submit two electronic copies of all the archived documents in the software program be delivered to the RPR. The files shall contain the approved Submittals, RFIs and other record documents. SEE 1.8 below.
- G. Reports: Submit written report weekly indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

# 1.4 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  - 1. Maintenance of Drawings: Maintain the drawings in a clean, dry, legible condition. Keep drawings available during normal working hours for inspection by the RPR.
  - 2. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding photographic documentation.
  - 3. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or RFI.

- k. Changes made following RPR's written orders.
- 1. Details not on the original Contract Drawings.
- m. Field records for variable and concealed conditions.
- n. Record information on the Work that is shown only schematically.
- 4. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
- 5. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- 6. Mark important additional information that was either shown schematically or omitted from original Drawings.
- 7. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

## 1.5 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  - 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
  - 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.
- B. Format: Submit record specifications as annotated PDF electronic file.

# 1.6 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.
- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  - 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

- C. Format: Submit Record Product Data as annotated PDF electronic file.
  - 1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

## 1.7 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.
  - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

#### 1.8 Electronic Management Software

A. All information managed and archived by the Electronic Management Software (Newforma, Procore, etc.) for submittals, RFIs, logs, meetings, etc. shall be downloaded from the provider site and two electronic copies provided to the RPR. The information shall be provided in an electronic format that is commonly used to retrieve and reproduce the information.

#### 1.9 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for RPR's and Architect's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839p

## SECTION 01 79 00 DEMONSTRATION AND TRAINING

#### PART 1 - GENERAL

#### 1.1 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

# Note that final approved copies of Operation and Maintenance Manuals must be received by the Owner prior to any demonstrations or training.

- 1. Demonstration of operation of systems, subsystems, and equipment.
- 2. Training in operation and maintenance of systems, subsystems, and equipment.
- 3. Demonstration and training videotapes.
- B. See Divisions 02 through 34 Sections for specific requirements for demonstration and training for products in those Sections.

#### 1.2 SUBMITTALS

- A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
- B. Demonstration and Training Compact Disc: Submit two copies within seven days of end of each training module.

#### 1.3 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Preinstruction Conference: Conduct conference at Project site. Review methods and procedures related to demonstration and training.
- D. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by RPR.

#### PART 2 - PRODUCTS

#### 2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required.

- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include system and equipment descriptions, operating standards, regulatory requirements, equipment function, operating characteristics, limiting conditions, and performance curves.
  - 2. Documentation: Review emergency, operations, and maintenance manuals; Project Record Documents; identification systems; warranties and bonds; and maintenance service agreements.
  - 3. Emergencies: Include instructions on stopping; shutdown instructions; operating instructions for conditions outside normal operating limits; instructions on meaning of warnings, trouble indications, and error messages; and required sequences for electric or electronic systems.
  - 4. Operations: Include startup, break-in, control, and safety procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; operating procedures for emergencies and equipment failure; and required sequences for electric or electronic systems.
  - 5. Adjustments: Include alignments and checking, noise, vibration, economy, and efficiency adjustments.
  - 6. Troubleshooting: Include diagnostic instructions and test and inspection procedures.
  - 7. Maintenance: Include inspection procedures, types of cleaning agents, methods of cleaning, procedures for preventive and routine maintenance, and instruction on use of special tools.
  - 8. Repairs: Include diagnosis, repair, and disassembly instructions; instructions for identifying parts; and review of spare parts needed for operation and maintenance.

## PART 3 - EXECUTION

#### 3.1 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Owner will furnish an instructor to describe Owner's operational philosophy.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner with at least seven days' advance notice.

## 3.2 DEMONSTRATION AND TRAINING VIDEOTAPES

- A. General: Engage a qualified commercial photographer to record demonstration and training compact disc. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
  - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Videotape Format: Provide high-definition CD.

# END OF SECTION

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## SECTION 02 01 00 SUBSURFACE SOIL EXPLORATION

#### PART 1 GENERAL

#### 1.1 RESPONSIBILITY

A. The information and data furnished from subsurface soil investigation for HGR Terminal Expansion prepared by Hill-Carnes Engineering Associates, dated December 11, 2018 is furnished for the Contractor's information. It is to be expressly understood that the Owner, Architect, Engineer or Soils Engineer will not be responsible for any interpretation or conclusion drawn therefrom. The Contractor shall excavate to the grades, slopes, lines, and levels indicated irrespective of the materials encountered with no increase in the contract cost to the Owner.

PART 2 PRODUCTS

NOT USED

## PART 3 EXECUTION

NOT USED

END OF SECTION



Geotechnical Engineering Study HGR Terminal Expansion Hagerstown Regional Airport Hagerstown, Maryland HCEA Job No. H18093

Prepared for:

Mr. Mahesh Kukata, P.E. Airport Design Consultants, Inc. 6031University Boulevard, Suite 330 Ellicott City, Maryland 21046 December 11, 2018

Mr. Mahesh Kukata, P.E. Airport Design Consultants, Inc. 6031 University Boulevard, Suite 330 Ellicott City, Maryland 21046

Re: Geotechnical Engineering Study HGR Terminal Expansion Hagerstown Regional Airport Hagerstown, Maryland HCEA Project No. H18093 10228 Governor Lane Boulevard, Suite 3007 Williamsport, MD 21795 Phone (301) 582-4662 Fax (301) 582-4614 www.hcea.com

LIS-CARI

Dear Mr. Kukata:

Hillis-Carnes Engineering Associates, Inc. (HCEA) has completed the geotechnical engineering study for the above-referenced project site that is located in Hagerstown, Maryland.

The exploration consisted of drilling Standard Penetration Test (SPT) borings, performing soil laboratory testing and engineering analyses, and preparing this written report of findings and conclusions.

We recommend that construction monitoring services be performed by HCEA. This will help verify that the project design and construction are consistent with the assumptions made in the analyses and conclusions contained in this report.

Boring samples will be stored at our Hagerstown, Maryland office for a minimum period of 30 days from the date of this letter. Should you wish the samples to be stored for a longer period of time or to be delivered to you or another party, please advise us. Should you have any questions or require additional information about our report, please contact us.

Most sincerely, HILLIS-CARNES ENGINEERING ASSOCIATES, INC.

Cindy S. Shepeck Vice President Branch Manager

Michael P. Johnson, P.E. Assistant Vice President Principal Engineer

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# <u>GEOTECHNICAL ENGINEERING STUDY</u> <u>HGR TERMINAL EXPANSION</u> <u>HAGERSTOWN, MARYLAND</u> <u>HCEA PROJECT NO. H18093</u>

# 1.0 PURPOSE AND SCOPE

The purpose of this study was to determine the subsurface conditions at the boring locations and to evaluate those conditions with respect to concept and design of a foundation system, floor slabs, and site work for the proposed construction.

The evaluations and recommendations presented in this report were developed from an analysis of project characteristics and an interpretation of the general subsurface conditions at the site, based on the boring information. The stratification lines indicated on the Records of Soil Exploration (boring logs) represent the approximate boundaries between soil types. In-situ, however, the transitions may be gradual. Such variations can best be evaluated during construction and, if necessary, any minor design changes can be made at that time.

An evaluation of the site with respect to potential construction problems and recommendations dealing with the earthwork, and monitoring and testing services during construction are also included. The construction monitoring and testing services are considered necessary to verify the subsurface conditions and to verify the soils-related construction phases are performed properly.

The Appendix contains a summary of the field and laboratory work on which this report is based.

# 2.0 PROJECT CHARACTERISTICS

The project site is located to the north of the existing passenger terminal at the Hagerstown Regional Airport, just off of Showalter Road in Hagerstown, Maryland. The project site consists of an approximate 5323 sq.-foot addition and a new boarding bridge foundation. A Site Location Map is included in the Appendix of this report.

The majority of the site is currently improved with an existing terminal building and associated surface concrete/bituminous paving for the apron. The site is generally flat in the vicinity of the proposed expansion with some slight slope decrease from the building to the apron for surface water runoff control.

The site development is expected to be comprised of a new terminal waiting area containing a maximum of 5323 square feet of floor area in a single-story within the main building structure.

At the time of this report, preliminary structural loading information was provided by your office. According to the information provided, the building will have a continuous foundation bearing load of approximately 3000 lbs./ln-ft and the columns will have a maximum load of 30 kips. It is anticipated that the loading for boarding bridge will consist of approximately 75-kips. Settlements on the order of 1-inch total and 1/2-inch differential have been assumed to be tolerable by the structures.

Should any of the project characteristics, structural loading conditions, or required settlement criteria differ from those outlined above, then this office should be contacted for a re-evaluation of the site.

# 3.0 FIELD EXPLORATION

A total of three (3) Standard Penetration Test (SPT) soil borings was drilled at the site for the purpose of this study. Borings T-1, B-32 and B-35 were drilled within the vicinity of the proposed structure expansion for the pavement evaluation and within the proposed boarding bridge to depths ranging from 4.5 to 20.2 feet below existing site grades. Boring locations were selected by HCEA in collaboration with the client and were rough staked in the field by HCEA personnel while referencing existing landmarks. Elevations for the boring locations were interpolated from the available site plans. The approximate boring locations are shown on the Boring Location Plan (Figure 2) included in the Appendix.

The borings were advanced with hollow-stem augers and the subsurface soils were sampled at 2.5 ft and 5.0 ft intervals. Samples were taken by driving a 1-3/8-inch I.D. (2-inch O.D.) split-spoon sampler in accordance with ASTM D-1586 specifications. The sampler was first seated 6 inches to penetrate any loose cuttings and then was driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is designated as the "Penetration Resistance" or "N" value. The penetration resistance, when properly evaluated, is an index of the soil strength and compression characteristics, are found in the Records of Soil Exploration (boring logs) included in the Appendix.

Also, rock coring was performed at boring location T-1 and extended 12 feet below where the auger refusal was encountered within this boring location. Rock core exploration findings can be found in the Appendix on the Record of Soil Exploration for Boring T-1.

Representative portions of each soil sample were placed in glass jars and transported to Hillis-Carnes' laboratory. In the laboratory, the samples were visually examined by the Geotechnical Engineer to verify the driller's field classifications.

The samples were visually classified in general accordance with the Unified Soil Classification System and the field classifications were revised where necessary. The Unified Soil Classification Symbols appear on the boring logs and the system nomenclature is briefly described in the Appendix.

# 4.0 SUBSURFACE CONDITIONS

Details of the subsurface conditions encountered at the site are shown on the Records of Soil Exploration (boring logs). A brief description of the subsurface conditions and pertinent engineering characteristics of the soils are given below.

Strata divisions shown on the boring logs have been estimated based on examinations of the recovered boring samples. In the field, strata changes could occur gradually and/or at slightly different levels than indicated. Also, any groundwater conditions indicated on the boring logs are those observed during the period of the subsurface exploration. Fluctuations in groundwater levels could occur seasonally and might also be influenced by changes in grading, runoff and infiltration rates, and other influencing factors.

Generalized subsurface conditions based on the results of the borings are discussed in detail in the following report sections. For more specific information on soil and groundwater conditions, please refer to the individual boring logs in the Appendix.

# 4.1 <u>General Site Geology</u>

The Geologic Map of Maryland (1968) shows that the project site is located in an area where the parent bedrock formation could include the limestones of the Rockdale Run Formation of the Beekmantown Group.

The Rockdale Run Formation typically consists of "upper one-third gray, mottled cherty dolomite and dolomitic limestone; lower two-thirds gray, cherty, argillaceous calcarenite and algal limestone; thickness at least 1,700 feet east of the Conococheague Creek, increases to the west to 2,500 feet."

In-situ decomposition of limestone materials typically produces surficial layers of residual soil of significant variable thicknesses. Localized concentrations of bedding planes, fractures, or other discontinuities often result in decomposition extending to deeper levels in the subsurface profiles. Ridges and lenses of rock that is relatively resistant to decomposition form pinnacles of unweathered bedrock that can extend up to and nearly up to the ground surface. The localized deeper levels of decomposition and rock pinnacles all combine to form a highly irregular rock surface. Occasionally, solution cavities develop below or within the rock

surface. The cavities are sometimes left open or are filled with soft, reworked residual materials.

# 4.2 <u>Surficial Covering</u>

In SPT borings, B-32 and B-35, a 5- to 18-inches thick pavement section was covering the area encompassing this portion of the site, overlying the 12-inches of stone subbase encountered in boring B-35 or natural materials within B-32. Within boring B-1, a topsoil layer of 3+/- inches was encountered overlaying the soil materials described in the following sections. However, topsoil/root mat thickness may vary across the site as it is currently a commercially landscaped area. As such, the boring logs should not be used solely to estimate topsoil and/or pavement removal quantities at the site.

# 4.3 <u>Man-Placed Fill Materials</u>

Within T-1 boring location, a layer of fill materials was encountered just below the topsoil layer to approximately 2 feet below existing grade. The encountered materials consisted of clay, with various amounts of silt, rock fragments and organics.

Please note that test borings are not a definitive method of evaluating the presence and composition of existing fill materials because of the limited size of the hole diameters and the very limited sample sizes obtained in comparison to the areal extent of the site. Also, the fill materials may be similar in composition to the on-site natural soils and therefore would be difficult to distinguish in the relatively small boring samples obtained.

It should be anticipated that man-placed fill materials may be encountered at other locations and to different depths due to the previous uses at the site. For more specific information, refer to the Records of Soil Exploration in the Appendix.

# 4.4 <u>Natural Materials</u>

The natural soils encountered immediately beneath the surficial and fill materials encountered consisted of predominantly low-plasticity clays (CL), including variable amounts of silts and rock fragments. The fine- grained materials encountered displayed consistencies ranging from medium stiff to stiff.

Refusal to auguring and/or spoon refusal also occurred in T-1 at a depth of 8.1 feet below existing site grade. Refusal is a designation typically applied to material having a penetration resistance in excess of 50 blows per inch. Refusal may result from hard cemented soil, soft weathered rock, boulders, thin rock seams, or the upper surface of continuous rock. Rock coring was performed to determine the nature and competency of the refusal materials. The percent recovery in the boring ranged from 0 to 100 percent with RQD values ranging from 1 to 66 percent within the rock runs obtained within this sample location.

# 4.5 Groundwater

Groundwater was monitored during drilling and at completion of drilling. Groundwater was not encountered within the depths explored in the borings at the time of our subsurface exploration.

A more accurate determination of the hydrostatic water table would require the installation of perforated pipes or piezometers that could be monitored over an extended period of time. The actual level of the hydrostatic water table and the amount and level of perched water should be anticipated to fluctuate throughout the year, depending on variations in precipitation, surface run-off, infiltration, site topography, and drainage.

# 5.0 EVALUATIONS AND RECOMMENDATIONS

Our findings indicate that the site can be developed for the proposed structures utilizing spread footing foundation support. The following recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions. If there are any changes to the project characteristics or if different subsurface conditions are encountered during construction, Hillis- Carnes should be consulted so that the recommendations of this report can be reviewed and revised, if necessary.

# 5.1 <u>General Site Preparation</u>

Any existing below ground structures within the areas to be developed should be removed prior to the initiation of new construction. We suggest that all available information regarding the existing utilities at the site be reviewed prior to construction.

Removal should include all underground pipes, utilities, and underground structures that might interfere with the new construction. If abandoned underground utilities are to be removed prior to the initiation of construction, provisions should be made in the construction specifications and budget to

restore the subgrade to stable condition. Restoration should include backfilling and compaction of the excavation areas.

Removal should also include topsoil and unsuitable till materials; unapproved man-placed materials; frozen, wet, soft or very loose soils; and any other deleterious materials. These operations should be performed in a manner consistent with good erosion and sediment control practices.

Any additional evidence of sinkholes noted during construction may require additional field exploration (such as test pitting). These areas should be remediated in accordance with the recommendations in Section 5.2 of this report prior to the placement of new fill materials.

After the initial stripping process is completed, areas of the site to receive fill, or areas of the site at-grade where structures will be located, should be proof rolled. The proofrolling operations should be performed using a 20-ton, fully-loaded dump truck or another pneumatic-tire vehicle of similar size and weight. The purpose of the proofrolling will be to provide surficial densification and to locate any near-surface pockets of soft or loose soils requiring undercutting. A Geotechnical Engineer or experienced Soils Inspector should witness the proofrolling operations and determine whether any areas require undercutting and/or stabilization.

In areas where rock and auger refusal were encountered, more intensive excavation efforts will be required. In particular, areas of confined excavation may require blasting, ripping, jackhammering, or other rock excavation methods to establish proposed elevations. It should also be anticipated that boulders, hard spots or other localized areas of difficult excavation may be encountered.

It is recommended that an expert in blasting be consulted to evaluate the best methods to be used to protect all existing adjacent structures. It is recommended that the existing structures and vibrations be monitored throughout the blasting process. All exposed subgrades should be observed by HCEA to verify that all loose or otherwise unsuitable material is removed. Our representative should also look for any evidence of sinkholes that would need to be remediated prior to constructionactivities.

# 5.2 Sinkholes and Karst Topography

The greater Hagerstown area has what is referred to as a Karst Topography, and is underlain by a multifarious assortment of limestone substrata. The calcareous nature of this substrata and its variable weatherability lead to a somewhat irregular landscape. More resistant materials form pinnacles of rock near or at the surface, while less resistant materials have parented deeper pockets of soil materials.

Fractures due to tectonic shifting have allowed access to, the dissolution of, and removal of more weatherable substrata materials beneath less weatherable ones. This removal can produce voids that may become unstable if the overburden becomes too great. At this point a failure will occur and collapse is probable. Historical collapses can be disguised over time by climatic forces. This fact makes subsurface exploration and evaluation imperative. It is also the reason subgrades are to be inspected prior to any construction operations involving the use of natural soils on Karst topography.

Although no expressed sinkholes were encountered during our exploration, any sinkholes encountered during construction should be remediated on a case-by-case basis. The geotechnical engineer should be contacted for site-specific recommendations when any sinkholes are observed.

To reduce the risk of sinkhole development, it is considered essential that adequate site drainage is provided at all times to minimize any increases in the moisture contents of the subsurface materials and to avoid aggravating incipient solution activity.

Site grades should be sloped to prevent the ponding of water adjacent to the proposed buildings or structures. Final designs should incorporate measures that will reduce water infiltration, including the following:

- Edge drains that flow directly to the storm drain system.
- Water tight storm drains.
- Swales adjacent to roadways should be lined with concrete, asphalt or soil/cement to prevent infiltration. Unlined swales are a very common cause of sinkhole development.

Utilities should be placed on well compacted firm soil to reduce possible settlement and leaks. Consideration should be given to hanging the utilities off of the floor slab to reduce the potential risk associated with both sinkhole development and potential settlements of the existing man-placed materials. Open graded stone should not be placed below the utility lines, as the stone easily transports water. Additionally, water lines should be periodically tested for leaks. Backfill around structures and

above utilities should be well compacted to reduce surface depressions which could collect water.

The client must acknowledge that there is always some risk associated with developing new structures in limestone (Karst) terrain, regardless of the extent of the exploration and/or design precautions. The possibility of sinkhole development can be reduced by taking the precautions included herein.

# 5.3 Fill Selection, Placement and Compaction

All material to be used as fill or backfill should be inspected, tested and approved by the Geotechnical Engineer. In general, the on-site soils which are free from organic and other deleterious components can be re-used as general site fill. Materials suitable for various construction purposes can be identified by an experienced Soils Inspector during grading operations.

Moisture conditioning (that is, wetting or drying) of the soils should be anticipated to achieve proper compaction, particularly if earthwork is performed other than in the summer months. The moisture contents of the soils should be controlled properly to avoid extensive construction delays. If imported fill material is required, those materials should have Unified Soil Classifications of SM or better.

All fill should be placed in relatively horizontal 8-inch (maximum) loose lifts and should be compacted to a minimum of 95 percent of the Modified Proctor (ASTM D-1557) maximum dry density. Fill materials in landscape and other non-structural areas should be compacted to at least 90 percent of the Modified Proctor maximum dry density if significant subsidence of the fill under its own weight is to be avoided. Field moisture contents should be maintained within 2 percentage points of the optimum moisture content in order to provide adequate compaction.

Structural fill should extend a minimum of ten feet beyond structural fill pads. Fill slopes no steeper than 2(H):1(V), or flatter, should be used. New fill materials should be properly benched into any existing slopes. A sufficient number of in-place density tests should be performed by an experienced Engineering Technician on a full-time basis to verify that the proper degree of compaction is being obtained.

# 5.4 Foundations

Our findings indicate that the proposed structures can be supported on shallow foundation system, such as spread footings, bearing on approved

natural soils, rock, newly placed engineered fill or a combination thereof. Footings should not be placed on or over any existing fill materials, should they be encountered, unless specifically approved by the Geotechnical Engineer.

Based on the general soil conditions that were encountered, it is our judgment that an allowable soil bearing pressure of 2500 lbs./sq. ft can be used for foundations to be supported on approved natural soils, new structural fill placed over firm natural soils and rock. However, we recommend that rock, if encountered at the foundation bearing elevation, be removed at least 8 inches beneath proposed bottom of footing elevation and restored with properly compacted fill materials, such as sand to act as a buffer.

Based on information provided by your office, the column loads will be in the range of 30 kips and the continuous wall footing loads will be on the order of 3 kips per linear foot. Based on the subsurface conditions encountered in the soil borings and the anticipated structural loads, we expect footing settlements are not to exceed 1 inch. Differential settlements between similarly loaded footings are not expected to exceed 1/2 inch. However, if the loads differ from those provided, then this office should be contacted for further recommendations.

To preclude punching shear failures, wall footings should be at least 18 inches wide and column footings should be at least 24 inches wide. It is recommended that wall footings be provided with longitudinal reinforcement. Such reinforcement would provide the footings with greater bending capacity that should allow them to span across unsupported length of six feet to bridge any localized weak zones that may go undetected during construction.

All footing excavations should be inspected by a Geotechnical Engineer or experienced Soils Inspector prior to the placement of concrete. The purpose of the inspection would be to verify that the exposed materials will be capable of supporting the design bearing pressure. If soft or very loose pockets are encountered in the footing excavations, the unsuitable materials should be removed and the footings should be located at a lower elevation. Alternatively, the unsuitable materials could be undercut and replaced with either new fill placed and compacted in accordance with the recommendations of Sections 5.1 and 5.3 of this report or with lean (2000 psi) concrete.

In all areas where foundations will be supported on structural fill, the structural fill should extend a sufficient distance laterally beyond the

perimeters of footings. For design purposes, plans should reflect structural fill extending a minimum distance of 9 inches laterally beyond a footing perimeter for each linear ft of structural fill below the bearing level.

Exterior footings and footings in unheated areas should be located at depths of at least 2.5 ft below final exterior grades so as to provide adequate protection from frost heave. If the structures are to be constructed during the winter months or if the building interior will likely be subjected to freezing temperatures after footing construction, then all footings should be provided with adequate frost cover protection. Otherwise, interior footings can be located on suitable materials at nominal depths below finished floor grade.

# 5.5 <u>Ground-Supported Slabs</u>

Floor slabs should be supported on approved firm natural soils, approved existing fill materials, or on new compacted fill. The slab subgrade should be prepared in accordance with the procedures outlined in Sections 5.1 and 5.3 of this report. In particular, the slab subgrade should be heavily proof rolled to delineate any soft or loose areas requiring undercutting and/or stabilization.

It is recommended that the slab be directly supported on a minimum 4-inch layer of clean granular materials such as washed sand, clean sand and gravel, or screened, crushed stone. These materials will require acquisition from an off-site source. A suitable moisture/vapor barrier (that is, polyethylene sheeting) should also be provided. These procedures will provide a moisture break that will help to prevent capillary rise, dampness of the floor slabs and also help to cure the slab concrete. It is also recommended that construction joints on the slab surface and isolation joints between the slab and structural walls be provided (such that the slab would be ground-supported).

On most projects, there is a significant time lag between initial grading and a point when the contractor is ready to pour the slabs-on-grade. Exposure to the elements and construction traffic often disturb the subgrade soils. Provisions should be made in the construction specifications for the restoration of the subgrade soils to a stable condition prior to the placement of the concrete for the floor slab.

# 5.6 Groundwater and Drainage

As previously mentioned, groundwater was not encountered within the depths explored in any of the soil borings drilled within the site. However,

any water infiltration resulting from a shallow interception of the groundwater table, precipitation, surface run-off, or perched water should be able to be controlled by means of sump pits and pumps, or by gravity ditching procedures. If any conditions are encountered which cannot be handled in such a manner, this office should be consulted.

Adequate drainage should be provided at the site to minimize any increases in the moisture contents of the foundation soils. All pavement or parking areas should be sloped away from the structures to prevent the ponding of water. In pavement/parking lot areas, it may be necessary to locally provide finger drains where it is not possible to properly slope pavement subgrades to catch basins or other outlets.

# 5.7 <u>Site Seismicity</u>

According to the 2012 International Building Code, Section 1613.3.2 (Chapter 20 of ASCE 7), seismic Site Class C should be specified for this project.

# 6.0 <u>RECOMMENDED ADDITIONAL SERVICES</u>

Additional soil and foundation engineering, testing, and consulting services recommended for this project are summarized below:

<u>Site Preparation and Proofrolling</u>: A Geotechnical Engineer or experienced Soils Inspector should inspect the site after it has been stripped and excavated. The inspector should determine if any undercutting or in-place densification is necessary to prepare pavement or building subgrades for fill placement or for slab support.

<u>Fill Placement and Compaction</u>: A Geotechnical Engineer or experienced Soils Inspector should witness any required filling operations and should take sufficient in-place density tests to verify that the specified degree of fill compaction is achieved. He should observe and approve borrow materials used and should determine if their existing moisture contents are suitable.

<u>Footing Excavation Inspections</u>: A Geotechnical Engineer or experienced Soils Inspector should inspect the footing excavations for the building. He should verify that the design bearing pressure is available and that no loose pockets exist beneath the bearing surfaces of the footing excavations. Based on the inspection, the Inspector would either approve the bearing surfaces or recommend that loose or soft soils be undercut to expose satisfactory bearing materials.
<u>Test Pits and Additional Soil Exploration</u>: A Geotechnical Engineer or experienced Soils Inspector should inspect subgrade soil materials excavated within portions of the site that have questionable suitability for their proposed use. Based on this additional exploration of subsurface conditions prior to construction, recommendations regarding the suitability of the site's subgrade can be made and precautionary recommendations regarding construction operations on the site can be given.

## 7.0 <u>REMARKS</u>

This report has been prepared to aid in the evaluation of the site for the proposed construction. It is considered that adequate recommendations have been provided to serve as a basis for design and preparation of plans and specifications. Additional recommendations can be provided as needed.

These analyses and recommendations are, of necessity, based on the information made available to us at the time of the actual writing of the report and the on-site surface and subsurface conditions that existed at the time the exploratory borings were drilled. Further assumption has been made that the limited exploratory borings, in relation both to the areal extent of the site and to depth, are representative of conditions across the site.

If subsurface conditions are encountered which differ from those reported herein, this office should be notified immediately so that the analyses and recommendations can be reviewed and/or revised as necessary. It is also recommended that:

- 1. We are given the opportunity to review any plans and specifications in order to comment on the interaction of the soil conditions as described herein and the design requirements.
- 2. The Geotechnical Engineer or his designated representative is present at the site during the construction phase to verify installation according to the approved plans and specifications. This is particularly important during excavation, placement, and compaction of fill materials.

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties either implied or expressed. HCEA assumes no responsibility for interpretations made by others based on work or recommendations by us.

## <u>APPENDIX</u>

Figure 1: Site Location Plan

Figure 2: Boring Location Plan

Records of Soil Exploration (Test Boring Logs)

General Geotechnical Notes



## Figure 1: Site Location Plan

HGR Terminal Expansion Hagerstown, MD HCEA Project No.: H18093 10228 Governor Lane Boulevard

Williamsport, Maryland

Local 301-582-4662

Fax 301-582-4614

ENGINEERINGASSOCIATES, INC.

**LLIS-CARNES** 



## HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

Project Name    HGR Runway Evaluation    Boring No.    T-1      Location    Hagerstown, Maryland    Job #    H18093      SAMPLER      Datum    MSL    Hammer Wt.    140 lbs.    Ibs.    Hole Diameter    2.25"    Foreman    C. Leatherman	
LocationJob #H18093 SAMPLER DatumMSLHammer Wt140 lbsIbs. Hole Diameter2.25"ForemanC. Leatherma	
SAMPLER        Datum      MSL      Hammer Wt.      140 lbs.      Ibs.      Hole Diameter      2.25"      Foreman      C.      Leatherman	
Elev.    ft    Hammer Drop    30"    in    Rock Core Diameter    Inspector    C. Shepeck      Data Standard    0/40/2018    Diag Size    2.0 " OD    in    Data Mathed    USA    Data Completed 0/40/2018	<u>ın</u> Surf.
Date StartedDate Completed In Boring MethodDate CompletedDate Completed	-
Elevation/ SYMBOLS/ Depth  SOIL SYMBOLS/ CONDITION  Description  Boring and Sampling Notes  No.  Rec.  SPT Blows  SPT Blows/Foot	NM
Dark brown, moist, medium stiff silty  Topsoil: 5"  1  12"  1-2-3-2  5  10  30  50    CLAY, some rock fragments and  Topsoil: 5"  1  12"  1-2-3-2  5  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10  10 <td></td>	
2 16" 3-4-5-9 9	
Spoon deflected on a rock ledge for last 2 increments 3 20" 6-9-*-* 9+	
Spoon deflected on a rock ledge for last increment 4 9" 2-2-12-* 14	
Limestone, highly fractured and Recovery: 1% RQD: 0% 5 1"	
Limestone, fractured, slightly Recovery: 49% RQD: 100%	
Limestone, fractured, slightly weathered. Limestone, fractured, slightly weathered.	

F SAMPLER TYPE	SAMPLE CONDITIONS		GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE PT - PRESSED SHELBY TUBE	D - DISINTEGRATED I - INTACT	AT COMPLETION AFTER 24 HRS.	dry ft N/A ft	6.0' ft <u>N/A</u> ft	HSA - HOLLOW STEM AUGERS CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTERHRS	ft	ft	DC - DRIVING CASING
RC - ROCK CORE	L - LOST				MD - MUD DRILLING

Bottom of Hole at 20.2'

- 24

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

## HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION

Project Name	e	HGR Run	way Evaluation		E	Boring No		В	-32	
Location		Hagerstow	n, Maryland			Job #		H180	93	
Datum Elev Date Started	8	Hammer Wt4 ft Hammer Drop /29/2018 Pipe Size2.0	SAMPLER 0 lbs. Ibs. Hole Diamete 30" in Rock Core E "OD in Boring Meth	er Diameter_ od	2.25 HSA	"Foren Inspe Date	nan ctor Comple	<u>C.</u> C eted <u>8/2</u>	Leathe Shep 9/2018	erman Surf. eck
Elevation/ S	SOIL SYMBOLS/ SAMPLE ONDITION	Description	Boring and Sampling Notes	No.	Rec.	SPT Blows	N	SPT Blow C	vs/Foot urve	NM
Depth 1		12" of Concrete 6" of Asphalt Orangish brown, moist, medium s to stiff, CLAY. (CL) Bottom of the hole at 5.5 feet.	tiff No groundwater encountere while drilling Backfilled at completion	1 2 2	21"	3-4-4-8	8			
- - 9 - -										

SAMPLER TYPE	SAMPLE CONDITIONS		GROUND WATER	CAVE IN DEPTH	BORING
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION	<u>dry</u> ft	2.5' ft	HSA - HO
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS.	ft	ft	CFA - CC
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTERHRS.	ft	ft	DC - DRI
RC - ROCK CORE	L - LOST				MD - MU

BORING METHOD HSA - HOLLOW STEM AUGERS CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVING CASING MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

## HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION

Project Name	HGR Runway	v Evaluation		B	oring No		В	-35	
Location	Hagerstown, N	laryland		J	ob #		H180	93	
Datum Elev Date Started8	Hammer Wt. <u>140 lk</u> ft Hammer Drop <u>30</u> 3/29/2018 Pipe Size <u>2.0 " C</u>	SAMPLER      DS.    lbs.    Hole Diameter_      "    in    Rock Core Dia      DD    in    Boring Method	meter_	2.25" HSA	ForenInspe	nan ctor Comple	<u>C.</u> <u>C</u> eted <u>8/2</u>	<u>Leath</u> . Shep 9/2018	<u>erman</u> Surf. :eck }
Elevation/ SOIL SYMBOLS SAMPLE Depth ONDITION	/ Description	Boring and Sampling Notes	No.	Rec.	SPT Blows	N	SPT Blov C	vs/Foot urve	NM
- 7.5	5" of Asphalt 12" of Gravel Dark brown, moist, very stiff to medium stiff, silty CLAY, some limestone fragments. (CL/ML) Bottom of the hole at 4.5 feet.	No groundwater encountered while drilling Backfilled at completion	1	19" 24"	20-17-7-5 2-3-4-4	24			

SAMPLER TYPE	SAMPLE CONDITIONS		GROUND WATER	CAVE IN DEPTH	BOR
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION	<u>dry</u> ft	<u>2.0'</u> ft	HSA
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS.	ft	ft	CFA
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTERHRS.	ft	ft	DC -
RC - ROCK CORE	L - LOST				MD -

BORING METHOD HSA - HOLLOW STEM AUGERS CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVING CASING MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS-CARNES ENGINEERING ASSOCIATES, Inc.

10228 Governor Lane Blvd., Williamsport, Maryland 21795 Phone: (301)582-4662 • Fax: (301)582-4614

## Description of Soils - per ASTM D2487

Major Component	Component Type	Component Description	Symbol	Group Name
Coarse-Grained Soils,	Gravels – More than 50% of the coarse	Clean Gravels <5%	GW	Well Graded Gravel
More than 50% is	fraction is retained on the No. 4 sieve.	Passing No. 200 sieve	GP	Poorly Graded Gravel
retained on the No. 200	Coarse = 1" to 3"	Gravels with fines, >12%	GM	Silty Gravel
sieve	Medium = $\frac{1}{2}$ " to 1"	Passing the No. 200 sieve	GC	Clayey Gravel
	Fine = $\frac{1}{4}$ " to $\frac{1}{2}$ "			
	Sands – More than 50% of the coarse	Clean Sands <5% Passing	SW	Well Graded Sand
	fraction passes the No. 4 sieve.	No. 200 sieve	SP	Poorly Graded Sand
Coarse = No.10 to No.4	Coarse = No.10 to No.4	Sands with fines, >12%	SM	Silty Sand
	Medium = No. 10 to No. 40	Passing the No. 200 sieve	SC	Clayey Sand
	Fine = No. 40 to No. 200			
Fine Grained Soils,	Silts and Clays	Inorganic	ML	Silt
More than 50% passes Liquid Limit is less than 50			CL	Lean Clay
the No. 200 sieve	Low to medium plasticity	Organic	OL	Organic silt
				Organic Clay
	Silts and Clays	Inorganic	МН	Elastic Silt
	Liquid Limit of 50 or greater		СН	Fat Clay
	Medium to high plasticity	Organic	ОН	Organic Silt
		-		Organic Clay
Highly Organic Soils	Primarily Organic matter, dark color, organic odor			Peat

## **Proportions of Soil Components**

Component Form	Description	Approximate percent by weight
Noun	Sand, Gravel, Silt, Clay, etc.	50% or more
Adjective	Sandy, silty, clayey, etc.	35% to 49%
Some	Some sand, some silt, etc.	12% to 34%
Trace	Trace sand, trace mica, etc.	1% to 11%
With	With sand, with mica, etc.	Presence only

## Particle Size Identification

Particle Size	Particle dimension	
Boulder	12" diameter or more	
Cobble	3" to 12" diameter	
Gravel	1/4" to 3" diameter	
Sand	0.005" to 1/4" diameter	
Silt/Clay (fines)	Cannot see particle	

## **Cohesive Soils**

Field Description	Consistency
Easily Molded in Hands	Very Soft
Easily penetrated several inches by thumb	Soft
Penetrated by thumb with moderate effort	Medium
Penetrated by thumb with great effort	Stiff
Indented by thumb only with great effort	Hard

## **Granular Soils**

No. of SPT Blows/ft	Relative Density
0-4	Very Loose
5 – 10	Loose
11 – 30	Medium Dense
31 – 50	Dense
Greater than 50	Very Dense

## Other Definitions:

- **Fill:** Encountered soils that were placed by man. Fill soils may be controlled (engineered structural fill) or uncontrolled fills that may contain rubble and/or debris.
- **Saprolite**: Soil material derived from the in-place chemical and physical weathering of the parent rock material. May contain relic structure. Also called residual soils. Occurs in Piedmont soils, found west of the fall line.
- Disintegrated Rock: Residual soil material with rock-like properties, very dense, N = 60 to 51/0".
- **Karst:** Descriptive term which denotes the potential for solutioning of the limestone rock and the development of sinkholes.
- Alluvium: Recently deposited soils placed by water action, typically stream or river floodplain soils.
- **Groundwater Level**: Depth within borehole where water is encountered either during drilling, or after a set period of time to allow groundwater conditions to reach equilibrium.
- **Caved Depth:** Depth at which borehole collapsed after removal of augers/casing. Indicative of loose soils and/or groundwater conditions.

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#### SECTION 02 41 19 SELECTIVE DEMOLITION

PART 1 - GENERAL

- 1.1 RELATED DOCUMENTS
  - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

#### A. Section Includes:

- 1. Demolition and removal of selected portions of building or structure.
- 2. Demolition and removal of selected site elements.
- 3. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
  - 1. Section 01 10 00 Summary for restrictions on the use of the premises, Owneroccupancy requirements, and phasing requirements.
  - 2. Section 31 10 00 Site Clearing for site clearing and removal of above- and below-grade improvements.

#### 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse. Natural rock excavated from the site is to be carefully salvaged and stored on-site per Section 12 93 00.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

#### 1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

#### 1.5 PREINSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project site.
  - 1. Inspect and discuss condition of construction to be selectively demolished.
  - 2. Review structural load limitations of existing structure.

- 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
- 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
- 5. Review areas where existing construction is to remain and requires protection.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- C. Schedule of Selective Demolition Activities: Indicate the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's facility manager's on-site operations are uninterrupted.
  - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
  - 4. Use of elevator and stairs.
  - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- D. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- E. Pre-demolition Photographs or Video: Submit before Work begins.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- G. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

#### 1.8 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

#### 1.9 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Historic Areas: It is not expected that historic areas or items will be encountered in the Work.
  - 1. If historical items, relics, antiques or similar items are encountered, immediately notify the architect and owner. Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.
- F. Storage or sale of removed items or materials on-site is not permitted.
- G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Maintain fire-protection facilities in service during selective demolition operations.

#### 1.10 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

#### PART 2 - PRODUCTS

#### 2.1 PEFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs or preconstruction videotapes.
  - 1. Comply with requirements specified in Section 01 32 30.
  - 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
  - 3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

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

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
  - 1. Comply with requirements for existing services/systems interruptions specified in Section 01 10 00.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. Arrange to shut off indicated utilities with utility companies.
  - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

#### 3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Comply with requirements for access and protection specified in Section 01 50 00.
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
  - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00.
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of selective demolition.

#### 3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated on demolition drawings. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
  - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
  - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
  - 5. Maintain adequate ventilation when using cutting torches.
  - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  - 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  - 9. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 50 50.

- B. Removed and Salvaged Items:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to Owner's storage area designated by Owner.
  - 5. Protect items from damage during transport and storage.
- C. Removed and Reinstalled Items:
  - 1. Clean and repair items to functional condition adequate for intended reuse.
  - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  - 3. Protect items from damage during transport and storage.
  - 4. Sort and store items on-site.
  - 5. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition cleaned and reinstalled in their original locations after selective demolition operations are complete.

#### 3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Reinforced Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings"
- F. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
  - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
  - 2. Remove existing roofing system down to substrate.
- G. Natural Stone Boulders: Remove, sort by size categories I-III on site for reuse on site in areas indicated on plan documents. Architect to flag boulders to be reused. Contractor to notify Architect 2 weeks in advance of moving the boulders confirmed for reuse. Contractor to provide 10% more boulders than indicated on documents for reuse and storage to allow for overage.

#### 3.6 DISPOSAL OF DEMOLISHED MATERIALS

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

- 1. Do not allow demolished materials to accumulate on-site.
- 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- 4. Comply with requirements specified in Section 01 50 50.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

#### 3.7 CLEANING

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

#### END OF SECTION

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#### SECTION 03 30 00 CAST-IN-PLACE CONCRETE

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Footings.
  - 2. Foundation walls.
  - 3. Slabs-on-grade.
  - 4. Suspended slabs.
- B. Related Sections include the following:
  - 1. Section 31 20 00 Earth Moving for drainage fill under slabs-on-grade.
  - 2. Section 32 13 13 Concrete Paving for concrete pavement and walks.

#### 1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
  - 1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.
- E. Samples (Information Only): For vapor retarder.
- F. Welding certificates (Information Only).
- G. Qualification Data (Information Only): For testing agency.
- H. Material Test Reports (Information Only): For the following, from a qualified testing agency, indicating compliance with requirements:
- I. Retain option in subparagraph below if retaining service record data with "Normal-Weight Aggregates" Paragraph in Part 2 "Concrete Materials" Article.

- J. Material Certificates (Information Only): For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Form materials and form-release agents.
  - 4. Steel reinforcement and accessories.
  - 5. Fiber reinforcement.
  - 6. Curing compounds.
  - 7. Floor and slab treatments.
  - 8. Bonding agents.
  - 9. Adhesives.
  - 10. Vapor retarders.
  - 11. Semirigid joint filler.
  - 12. Joint-filler strips.
  - 13. Repair materials.
- K. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.
- L. Field quality-control test and inspection reports.
- M. Minutes of preinstallation conference.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACIcertified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
  - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field-Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
  - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician -Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
  - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
  - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete manufacturer.
    - d. Concrete subcontractor.
  - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, vapor-retarder installation, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
  - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

#### 2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  - 1. Plywood, metal, or other approved panel materials.
  - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
    - a. High-density overlay, Class 1 or better.
    - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
    - c. Structural 1, B-B or better; mill oiled and edge sealed.
    - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.
- E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- H. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- I. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive damp proofing or waterproofing.

#### 2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.
- D. Plain-Steel Wire: ASTM A 82, as drawn.
- E. Deformed-Steel Wire: ASTM A 496.
- F. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- G. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- H. Galvanized-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from galvanized steel wire into flat sheets.
- 2.4 REINFORCEMENT ACCESSORIES
  - A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.

- B. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, ASTM A 775/A 775M epoxy coated.
- C. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.
- D. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.
- E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
  - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
  - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
  - 3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

#### 2.5 CONCRETE MATERIALS

1.

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - Portland Cement: ASTM C 150, Type I.
    - a. Fly Ash: ASTM C 618, Class C.
  - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
  - 2. Blended Hydraulic Cement: ASTM C 595, Type IS, Portland blast-furnace slag cement.
- B. Silica Fume: ASTM C 1240, amorphous silica.
- C. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
  - 1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Lightweight Aggregate: ASTM C 330, 1-inch nominal maximum aggregate size.
- E. Water: ASTM C 94/C 94M and potable.

#### 2.6 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

- C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.
  - 1. Available Products:
    - a. Boral Material Technologies, Inc.; Boral BCN.
    - b. Euclid Chemical Company (The); Eucon CIA.
    - c. Grace Construction Products, W. R. Grace & Co.; DCI.
    - d. Master Builders, Inc.; Rheocrete CNI.
    - e. Sika Corporation; Sika CNI.
- D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-setaccelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
  - 1. Available Products:
    - a. Axim Concrete Technologies; Catexol 1000CI.
    - b. Boral Material Technologies, Inc.; Boral BCN2.
    - c. Cortec Corporation; MCI 2000.
    - d. Grace Construction Products, W. R. Grace & Co.; DCI-S.
    - e. Master Builders, Inc.; Rheocrete 222+.
    - f. Sika Corporation; FerroGard-901.

#### 2.7 FIBER REINFORCEMENT

- A. Carbon-Steel Fiber: ASTM A 820, deformed, minimum of 1.5 inches long, and aspect ratio of 35 to 40.
  - 1. Available Products:
    - a. Bekaert Corporation; Dramix.
    - b. Fibercon International, Inc.; Fibercon.
    - c. SI Concrete Systems; Zorex.
  - 2. Fiber: Type 1, cold-drawn wire.
- B. Synthetic Fiber: Monofilament polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.
  - 1. Available Products:
    - a. Monofilament Fibers:
      - 1) Axim Concrete Technologies; Fibrasol IIP.
      - 2) Euclid Chemical Company (The); Fiberstrand 100.
      - 3) FORTA Corporation; Forta Mono.
      - 4) Grace Construction Products, W. R. Grace & Co.; Grace MicroFiber.
      - 5) Metalcrete Industries; Polystrand 1000.
      - 6) SI Concrete Systems; Fibermix Stealth.
    - b. Fibrillated Fibers:
      - 1) Axim Concrete Technologies; Fibrasol F.
      - 2) Euclid Chemical Company (The); Fiberstrand F.
      - 3) FORTA Corporation; Forta.
      - 4) Grace Construction Products, W. R. Grace & Co.; Grace Fibers.
      - 5) SI Concrete Systems; Fibermesh.

#### 2.8 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
  - 1. Available Products:
    - a. Fortifiber Corporation; Moistop Ultra A.
    - b. Raven Industries Inc.; Vapor Block 15.
    - c. Reef Industries, Inc.; Griffolyn Type-65G.

#### 2.9 FLOOR AND SLAB TREATMENTS

- A. Slip-Resistive Emery Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive, crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials with 100 percent passing 3/8-inch sieve.
  - 1. Available Products:
    - a. Anti-Hydro International, Inc.; Emery.
    - b. Dayton Superior Corporation; Emery Non-Slip.
    - c. Emeri-Crete, Inc.; Emeri-Topcrete.
    - d. Lambert Corporation; EMAĜ-20.
    - e. L&M Construction Chemicals, Inc.; Grip It.
    - f. Metalcrete Industries; Metco Anti-Skid Aggregate.
- B. Emery Dry-Shake Floor Hardener: Pigmented, factory-packaged, dry combination of Portland cement, graded emery aggregate, and plasticizing admixture; with emery aggregate consisting of no less than 60 percent of total aggregate content.
  - 1. Color: As selected by Architect from manufacturer's full range.

#### 2.10 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
  - 1. Available Products:
    - a. Axim Concrete Technologies; Cimfilm.
    - b. Burke by Edoco; BurkeFilm.
    - c. ChemMasters; Spray-Film.
    - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
    - e. Dayton Superior Corporation; Sure Film.
    - f. Euclid Chemical Company (The); Eucobar.
    - g. Kaufman Products, Inc.; Vapor Aid.
    - h. Lambert Corporation; Lambco Skin.
    - i. L&M Construction Chemicals, Inc.; E-Con.
    - j. MBT Protection and Repair, Div. of ChemRex; Confilm.
    - k. Meadows, W. R., Inc.; Sealtight Evapre.
    - 1. Metalcrete Industries; Waterhold.
    - m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
    - n. Sika Corporation, Inc.; SikaFilm.
    - o. Symons Corporation, a Dayton Superior Company; Finishing Aid.
    - p. Unitex; Pro-Film.
    - q. US Mix Products Company; US Spec Monofilm ER.
    - r. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
  - 1. Available Products:
    - a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
    - b. Burke by Edoco; Aqua Resin Cure.
    - c. ChemMasters; Safe-Cure Clear.

- d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; W.B. Resin Cure.
- e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
- f. Euclid Chemical Company (The); Kurez DR VOX.
- g. Kaufman Products, Inc.; Thinfilm 420.
- h. Lambert Corporation; Aqua Kure-Clear.
- i. L&M Construction Chemicals, Inc.; L&M Cure R.
- j. Meadows, W. R., Inc.; 1100 Clear.
- k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
- 1. Symons Corporation, a Dayton Superior Company; Resi-Chem Clear Cure.
- m. Tamms Industries, Inc.; Horncure WB 30.
- n. Unitex; Hydro Cure 309.
- o. US Mix Products Company; US Spec Maxcure Resin Clear.
- p. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

#### 2.11 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
  - 1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Reglets: Fabricate reglets of not less than 0.0217-inch- thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- F. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336-inch-thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

#### 2.12 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

- 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
- 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
- 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

#### 2.13 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent.
  - 1. Fly Ash: 25 percent.
  - 2. Combined Fly Ash and Pozzolan: 25 percent.
  - 3. Ground Granulated Blast-Furnace Slag: 50 percent.
  - 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent Portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
  - 5. Silica Fume: 10 percent.
  - 6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
  - 7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
  - 1. Use water-reducing admixture in concrete, as required, for placement and workability.
  - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
  - 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
- E. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

#### 2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: 3000 psi at 28 days.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
  - 3. Slump Limit: 4 inches, plus or minus 1 inch.
  - 4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
  - 5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
- B. Foundation Walls: Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: 3500 psi at 28 days.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.45.

- 3. Slump Limit: 4 inches, plus or minus 1 inch.
- 4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
- 5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
- C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: 4000 psi at 28 days.
  - 2. Minimum Cementitious Materials Content: 470 lb./cu. yd.
  - 3. Slump Limit: 5 inches, plus or minus 1 inch.
  - 4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
  - 5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
  - 6. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
  - 7. Steel-Fiber Reinforcement: Add to concrete mixture, according to manufacturer's written instructions, at a rate of 50 lb./cu. yd.
  - 8. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb./cu. yd.
- D. Suspended Slabs: Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: 3500 psi at 28 days.
  - 2. Minimum Cementitious Materials Content: 470 lb./cu. yd.
  - 3. Slump Limit: 5 inches, plus or minus 1 inch.
  - 4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
  - 5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
  - 6. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
  - 7. Steel-Fiber Reinforcement: Add to concrete mixture, according to manufacturer's written instructions, at a rate of 50 lb./cu. yd.
  - 8. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb./cu. yd.

#### 2.15 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

#### 2.16 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, and furnish batch ticket information.
  - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
  - 1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
  - For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
  - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

#### PART 3 - EXECUTION

#### 3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
  - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 1. Install keyways, reglets, recesses, and the like, for easy removal.
  - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

#### 3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
  - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3. Install dovetail anchor slots in concrete structures as indicated.

#### 3.3 SHORES AND RESHORES

- A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
  1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

#### 3.4 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
  - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.
- B. Bituminous Vapor Retarders: Place, protect, and repair vapor retarders according to manufacturer's written instructions.
- C. Granular Course: Cover vapor retarder with granular fill, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch or minus 3/4 inch.
  - 1. Place and compact a 1/2-inch- thick layer of fine-graded granular material over granular fill.

#### 3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

#### 3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

- 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
- 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
- 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
- 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
- 5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
  - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
  - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
  - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

#### 3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

- 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
- 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301 and as follows:
  - 1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

#### 3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull- floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in 1 direction.
  - 1. Apply scratch finish to surfaces indicated.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
  1. Apply float finish to surfaces to receive trowel finish.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of

trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

- 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
- 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
  - a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.
  - b. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
  - c. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.
  - d. Specified overall values of flatness, F(F) 45; and of levelness, F(L) 35; with minimum local values of flatness, F(F) 30; and of levelness, F(L) 24.
- 3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/4 inch.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly scarify surface with a fine broom.
  - 1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- G. Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces according to manufacturer's written instructions and as follows:
  - 1. Uniformly apply dry-shake floor hardener at a rate of 100 lb./100 sq. ft. unless greater amount is recommended by manufacturer.
  - 2. Uniformly distribute approximately two-thirds of dry-shake floor hardener over surface by hand or with mechanical spreader and embed by power floating. Follow power floating with a second dry-shake floor hardener application, uniformly distributing remainder of material, and embed by power floating.
  - 3. After final floating, apply a trowel finish. Cure concrete with curing compound recommended by dry-shake floor hardener manufacturer and apply immediately after final finishing.

#### 3.9 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

#### 3.10 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot- weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
  - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
    - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
  - 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

#### 3.11 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  - 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

#### 3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one-part Portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush- coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01-inch-wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 2. After concrete has cured at least 14 days, correct high areas by grinding.
  - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  - 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

- 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

#### 3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage a special inspector and to perform field tests and inspections and prepare test reports.
- B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
  - 1. Steel reinforcement placement.
  - 2. Steel reinforcement welding.
  - 3. Headed bolts and studs.
  - 4. Verification of use of required design mixture.
  - 5. Concrete placement, including conveying and depositing.
  - 6. Curing procedures and maintenance of curing temperature.
  - 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
  - 2. Testing Frequency: Obtain at least one composite sample for each 100-cu. yd. or fraction thereof of each concrete mixture placed each day.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  - 3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  - 4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - 5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

- 6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
- 7. Compression Test Specimens: ASTM C 31/C 31M.
  - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
  - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
- 8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
  - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
  - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
- 9. When strength of field-cured cylinders is less than 85 percent of companion laboratorycured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- 10. Strength of each concrete mixture will be satisfactory if every average of any threeconsecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- 11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- 12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- 13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
- 14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 15. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.
- E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

#### END OF SECTION
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#### **SECTION 04 10 00** MASONRY MORTAR AND GROUT

#### PART 1 GENERAL

#### **SUMMARY** 1.1

- A. Section includes mortar and grout for masonry.
- B. **Related Sections:** 
  - Section 04 20 00 Unit Masonry: Installation of mortar and grout. 1.
  - 2. Section 08 11 00 - Steel Doors and Frames: Grouting steel door frames.

#### REFERENCES 1.2

- American Concrete Institute: A.
  - ACI 530 Building Code Requirements for Masonry Structures. 1.
  - 2. ACI 530.1 - Specifications for Masonry Structures.

#### Β. **ASTM International:**

- ASTM C5 Standard Specification for Quicklime for Structural Purposes. 1.
- 2. ASTM C91 - Standard Specification for Masonry Cement.
- 3.
- ASTM C94/C94M Standard Specification for Ready-Mixed Concrete. ASTM C143/C143M Standard Test Method for Slump of Hydraulic Cement Concrete. 4.
- ASTM C144 Standard Specification for Aggregate for Masonry Mortar. 5.
- 6.
- ASTM C150 Standard Specification for Portland Cement. ASTM C199 Standard Test Method for Pier Test for Refractory Mortars. 7.
- 8. ASTM C206 - Standard Specification for Finishing Hydrated Lime.
- ASTM C270 Standard Specification for Mortar for Unit Masonry. 9.
- ASTM C387 Standard Specification for Packaged, Dry, Combined Materials 10. for Mortar and Concrete.
- ASTM C404 Standard Specification for Aggregates for Masonry Grout. 11.
- ASTM C476 Standard Specification for Grout for Masonry. 12.
- 13. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
- ASTM C780 Standard Test Method for Preconstruction and Construction 14.
- Evaluation of Mortars for Plain and Reinforced Unit Masonry.
- ASTM C1019 Standard Test Method for Sampling and Testing Grout. 15.
- ASTM C1142 Standard Specification for Extended Life Mortar for Unit Masonry. 16.
- 17. ASTM C1314 - Standard Test Method for Constructing and Testing Masonry Prisms Used to Determine Compliance with Specified Compressive Strength of Masonry.
- 18. ASTM C1329 - Standard Specification for Mortar Cement.
- 19. ASTM C1357 - Standard Test Method for Evaluating Masonry Bond Strength.

#### 1.3 **SUBMITTALS**

- Section 01 33 00 Submittal Procedures: Submittal requirements. A.
- B. Samples: Submit two samples of mortar, illustrating mortar color and color range.
- C. Design Data: Submit design mix when Property specification of ASTM C270 is to be used, required environmental conditions, and admixture limitations.
- D. **Test Reports:** 
  - Submit reports on mortar indicating conformance of mortar to property 1. requirements of ASTM C270 and test and evaluation reports to ASTM C780 for aggregate ratio and water content, air content, consistency and compressive strength.

- 2. Submit reports on grout indicating conformance of grout to property requirements of ASTM C476 and test and evaluation reports to ASTM C1019.
- E. Manufacturer's Installation Instructions: Submit premix mortar manufacturer's installation instructions.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

## 1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 and ACI 530.1.

## 1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 Product Requirements.
- B. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- C. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

## PART 2 PRODUCTS

## 2.1 MORTAR AND MASONRY GROUT

- A. Manufacturers:
  - 1. Essroc
    - 2. Riverton, Product Flamingo
    - 3. Laticrete
    - 4. Substitutions: Section 01 60 00 Product Requirements.

#### 2.2 COMPONENTS

- A. Mortar Cement: ASTM C1329, Types S.
- B. Mortar Aggregate: ASTM C144, standard masonry type.
- C. Grout Aggregate: ASTM C404, fine.
- D. Water: Clean and potable.
- E. Mortar Color: Flamingo C-55 with C-144 Sand.

#### 2.3 MIXES

- A. Mortar Mixes:
  - 1. Mortar for Structural Masonry: ASTM C270, Type S using Proportion specification.
  - 2. Mortar for Non-Structural Masonry: ASTM C270, Type S using Proportion specification.
  - 3. Pointing Mortar: ASTM C270, Type N using Proportion specification.
- B. Mortar Mixing:
  - 1. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.
  - 2. Achieve uniformly damp sand immediately before mixing process.
  - 3. Add mortar color and admixtures to achieve uniformity of mix and coloration.

- 4. Re-temper only within two hours of mixing.
- C. Grout Mixes:
  - 1. Grout for Non-Structural Masonry: 2,000 psi strength at 28 days; 8-11 inches slump; mixed in accordance with ASTM C476 Fine or Course grout.
  - 2. Grout for Structural Masonry: 2,000 psi strength at 28 days; 8-11 inches slump; mixed in accordance with ASTM C476 Fine or Course grout.
  - 3. Application:

a.

- Coarse Grout: For grouting spaces with minimum 4 inches dimension in every direction.
- b. Fine Grout: For grouting other spaces.
- D. Epoxy Mortar: Equal to Latapoxy SP-100.
  - 1. Stainless pigment free colorfast epoxy grout.
- E. Grout Mixing:
  - 1. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476.
  - 2. Add admixtures; mix uniformly.

## PART 3 EXECUTION

- 3.1 EXAMINATION
  - A. Section 01 31 00 Administrative Requirements: Coordination and project conditions.
  - B. Request inspection of spaces to be grouted.
- 3.2 PREPARATION
  - A. Apply bonding agent to existing concrete surfaces.
- 3.3 INSTALLATION
  - A. Install mortar and grout in accordance with ACI 530.1 Specifications for Masonry Structures.
  - B. Epoxy Mortar:

1.

- Surface Preparation: Before starting to grout remove spaces and debris in grout joints. Remove dust and dirt using a damp sponge. Do not leave water standing in joints. Do not clean tiles with acid base cleaners. Substrate temperature must be between 16°C and 32°C.
  - a. NOTE: Temperature will affect working properties of LATAPOXY SP-100 Stainless Grout. Warm temperatures will speed curing and shorten working time. Cool temperatures will slow curing and require longer time to traffic. Store LATAPOXY SP-100 Stainless grout at 21°C for 24 hours prior to use.
- 2. Mixing: Pour LATAPOXY SP-100 Stainless Grout Part A and Part B into a clean mixing pail and mix thoroughly by hand or with a slow speed mixer (<300 RPM) until liquids are completely blended. Add LATAPOXY SP-100 Stainless Grout Part C Filler Powder and mix until uniformly blended.
- 3. Application: Immediately pout entire contents of pain onto a flat surface (Do Not Leave in Pail). Spread with a sharp, firm rubber grout float. Work the grout paste into the joints until completely filled. Use diagonal strokes to pack the joints. Insure that joint is filled and grout is not just sitting on top (i.e. "bridging the joint").

4. Cleaning: Remove excess grout from the face of the tiles with the edge of the grout float. Hold the float at a 90° angle and pull it diagonally across the joints and tile to avoid pulling out the material. Clean using a white nylon pad and plenty of cool, clean water. For detailed application instructions and coverage information refer to Data Sheet 631.5.

## 3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Testing Frequency: One set of specified tests for every 5,000 sf of completed wall area.
- C. Testing of Mortar Mix: In accordance with ASTM C780 for aggregate ratio and water content, air content, consistency, and compressive strength.
- D. Testing of Grout Mix: In accordance with ASTM C1019 for compressive strength, and in accordance with ASTM C143/C143M for slump.
- E. Test flexural bond strength of mortar and masonry units to ASTM C1357; test in conjunction with masonry unit sections specified.
- F. Test compressive strength of mortar and masonry to ASTM C1314; test in accordance with masonry unit sections specified.

## 3.5 SCHEDULES

- A. Exterior Cavity Wall: Brick masonry with Type S mortar with Type N pointing mortar.
- B. Interior Masonry Walls: Type S mortar.

## END OF SECTION

#### SECTION 04 20 00 UNIT MASONRY

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
  - 1. Concrete masonry units (CMUs).
  - 2. Face brick.
  - 3. Building (common) brick.
  - 4. Hollow brick.
  - 5. Mortar and grout.
  - 6. Reinforcing steel.
  - 7. Masonry joint reinforcement.
  - 8. Ties and anchors.
  - 9. Embedded flashing.
  - 10. Miscellaneous masonry accessories.
  - 11. Cavity-wall insulation.
- B. Related Sections include the following:
  - 1. Section 07 26 10 Below Grade Vapor Retarders for dampproofing applied to cavity face of backup wythes of cavity walls.
  - 2. Section 07 65 10 Flexible Flashing Stainless Steel for exposed sheet metal flashing.
  - 3. Section 07 90 00 Joint Protection for sealing control and expansion joints in unit masonry.
- C. Products furnished, but not installed, under this Section include the following:
  - 1. Dovetail slots for masonry anchors, installed under 03 30 00 Cast-in-Place Concrete.
  - 2. Anchor sections of adjustable masonry anchors for connecting to structural frame, installed under Division 05 Section "Structural Steel Framing."
- D. Products installed, but not furnished, under this Section include the following:
  - 1. Steel lintels and shelf angles for unit masonry, furnished under Section 05 50 00 Metal Fabrications.
  - 2. Manufactured reglets in masonry joints for metal flashing, furnished under Section 07 65 10 Flexible Flashing Stainless Steel.

### 1.2 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths ( $f_m$ ) at 28 days.
- B. Determine net-area compressive strength (f'<sub>m</sub>) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- C. Determine net-area compressive strength ( $f_m$ ) of masonry by testing masonry prisms according to ASTM C 1314.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:
  - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
  - 2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
  - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection: For the following:
  - 1. Decorative concrete masonry units, in the form of small-scale units.
  - 2. Face brick, in the form of straps of five or more bricks.
  - 3. Colored mortar.
  - 4. Weep holes/vents.
- D. Samples for Verification: For each type and color of the following:
  - 1. Exposed concrete masonry units.
  - 2. Face brick, in the form of straps of five or more bricks.
  - 3. Special brick shapes.
  - 4. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
  - 5. Weep holes/vents.
  - 6. Accessories embedded in masonry.
- E. List of Materials Used in Constructing Mockups (Information Only): List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
  - 1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- F. Qualification Data (Information Only): For testing agency.
- G. Material Certificates (Information Only): Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
  - 1. Masonry units.
    - a. Include material test reports substantiating compliance with requirements.
    - b. For bricks, include size-variation data verifying that actual range of sizes falls within specified tolerances.
    - c. For exposed brick, include material test report for efflorescence according to ASTM C 67.
    - d. For surface-coated brick, include material test report for durability of surface appearance after 50-cycles of freezing and thawing per ASTM C 67.
    - e. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
    - Cementitious materials. Include brand, type, and name of manufacturer.
  - 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
  - 4. Grout mixes. Include description of type and proportions of ingredients.
  - 5. Reinforcing bars.
  - 6. Joint reinforcement.
  - 7. Anchors, ties, and metal accessories.

2.

- H. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
  - 1. Include test reports, per ASTM C 780, for mortar mixes required to comply with property specification.
  - 2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- I. Statement of Compressive Strength of Masonry (Information Only): For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- J. Cold-Weather Procedures (Information Only): Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

## 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.
- D. Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.
  - 1. Clay Masonry Unit Test: For each type of unit required, per ASTM C 67.
  - 2. Concrete Masonry Unit Test: For each type of unit required, per ASTM C 140.
  - 3. Mortar Test (Property Specification): For each mix required, per ASTM C 780.
  - 4. Grout Test (Compressive Strength): For each mix required, per ASTM C 1019.
  - 5. Prism Test: For each type of construction required, per ASTM C 1314.
- E. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.
- F. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 01 Section "Quality Requirements" for mockups.
  - 1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 48 inches long by 48 inches high by full thickness.
  - 2. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.
  - 3. Clean exposed faces of panels with masonry cleaner indicated.
  - 4. Protect approved sample panels from the elements with weather-resistant membrane.
  - 5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
    - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.

- G. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockup of typical wall area as shown on Drawings.
  - 2. Build mockups for typical exterior and interior walls in sizes approximately 60 inches long by 60 inches high by full thickness, including face and backup wythes and accessories.
    - a. Include a sealant-filled joint at least 16 inches long in exterior wall mockup.
    - b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.
    - c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
  - 3. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
  - 4. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
  - 5. Protect accepted mockups from the elements with weather-resistant membrane.
  - 6. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
    - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
    - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
  - 7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- H. Preinstallation Conference: Conduct conference at Project.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

### 1.7 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

- 2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
  - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

## 2.2 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

#### 2.3 CONCRETE MASONRY UNITS (CMUs)

- A. Shapes: Provide shapes indicated and as follows:
  - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  - 2. Provide bullnose units for outside corners, unless otherwise indicated.

- B. Concrete Masonry Units: ASTM C 90.
  - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3050 psi.
  - 2. Weight Classification: Normal weight.
  - 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
  - 4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
  - 5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.
- C. Concrete Building Brick: ASTM C 55.
  - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3500 psi.
  - 2. Weight Classification: Normal weight.
  - 3. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.

## 2.4 CONCRETE LINTELS

- A. General: Provide either concrete lintels, at Contractor's option, complying with requirements below.
- B. Concrete Lintels: Precast units made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcing bars indicated or required to support loads indicated. Cure precast lintels by same method used for concrete masonry units.
- C. Concrete Lintels: Precast or formed-in-place concrete lintels complying with requirements in Division 03 Section "Cast-in-Place Concrete."

### 2.5 BRICK

- A. General: Provide shapes indicated and as follows:
  - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
  - 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
  - 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
  - 4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Face Brick: ASTM C 216, Grade SW, Type FBX.
  - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 20,000 psi.
  - 2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
  - 3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
  - 4. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet.
  - 5. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
  - 6. Application: Use where brick is exposed, unless otherwise indicated.
  - 7. Provide face brick matching color range, texture, and size of existing adjacent brickwork.
    - a. Provide brick as manufactured by Sioux City Brick Co.; Color-Ebonite Satin; Type FBX; Size-Standard Modular, as supplied by Steffey & Findlay, Inc. 301-733-1600
  - 8. Color and Texture: Specified to match terminal building.

- 9. Available Products:
  - a. Provide brick as manufactured by Sioux City Brick Co.; Color-Ebonite Satin; Type FBX; Size-Standard Modular, as supplied by Steffey & Findlay, Inc. 301-733-1600.

## 2.6 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.
- D. Masonry Cement: ASTM C 91.
  - 1. Available Products:
    - a. Capital Materials Corporation; Flamingo Color Masonry Cement.
    - b. Essroc, Italcementi Group; Brixment.
    - c. Holcim (US) Inc.; Mortamix Masonry Cement.
    - d. Lafarge North America Inc.; Lafarge Masonry Cement.
    - e. Lehigh Cement Company; Lehigh Masonry Cement.
    - f. National Cement Company, Inc.; Coosa Masonry Cement.
- E. Colored Cement Product: Packaged blend made from Portland cement and lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
  - 1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
  - 2. Pigments shall not exceed 10 percent of Portland cement by weight.
  - 3. Pigments shall not exceed 5 percent of masonry cement by weight.
  - 4. Products:
    - a. Colored Portland Cement-Lime Mix:
      - 1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.
      - 2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
      - 3) Lafarge North America Inc.; Eaglebond.
      - 4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.
    - b. Color:
      - 1) Flamingo C-55 with C- 144 Sand.
- F. Aggregate for Mortar: ASTM C 144.
  - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
  - 2. For joints less than 1/4-inch-thick, use aggregate graded with 100 percent passing the No. 16 sieve.
  - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
  - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- G. Aggregate for Grout: ASTM C 404.
- H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
  - 1. Products:
    - a. Addiment Incorporated; Mortar Kick.
    - b. Euclid Chemical Company (The); Accelguard 80.

- c. Grace Construction Products, a unit of W. R. Grace & Co. Conn.; Morset.
- d. Sonneborn, Div. of ChemRex; Trimix-NCA.
- I. Water: Potable.

#### 2.7 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.
- B. Masonry Joint Reinforcement, General: ASTM A 951.
  - 1. Interior Walls: Hot-dip galvanized, carbon steel.
  - 2. Exterior Walls: Hot-dip galvanized, carbon steel.
  - 3. Wire Size for Side Rods: W1.7 or 0.148-inch diameter.
  - 4. Wire Size for Cross Rods: W1.7 or 0.148-inch diameter.
  - 5. Wire Size for Veneer Ties: W1.7 or 0.148-inch diameter.
  - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
  - 7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.
- C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.
- D. Masonry Joint Reinforcement for Multiwythe Masonry:
  - 1. Ladder type with 1 side rod at each face shell of hollow masonry units more than 4 inches in width, plus 1 side rod at each wythe of masonry 4 inches or less in width.
  - 2. Tab type, either ladder or truss design, with 1 side rod at each face shell of backing wythe and with rectangular tabs sized to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.
  - 3. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate ties that extend into facing wythe. Ties have two hooks that engage eyes or slots in reinforcement and resist movement perpendicular to wall. Ties extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.
- E. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.188-inch- diameter, hot-dip galvanized, carbon-steel continuous wire.

#### 2.8 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.
  - 1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 641/A 641M, Class 1 coating.
  - 2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
  - 3. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304.
  - 4. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 zinc coating.
  - 5. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
  - 6. Stainless-Steel Sheet: ASTM A 666, Type 304.
  - 7. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
  - 8. Stainless Steel bars: ASTM A 276 or ASTM a 666, Type 304.
- B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

- C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
  - 1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
  - 2. Where wythes do not align, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
  - 3. Wire: Fabricate from 3/16-inch-diameter, hot-dip galvanized steel wire.
- D. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire
  - 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.188-inch-diameter, hot-dip galvanized steel wire.
  - 3. Connector Section for Concrete: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.053-inch- thick, steel sheet, galvanized after fabrication.
  - 4. Tie Section for Concrete: Corrugated metal ties with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within 1 inch of masonry face.
- E. Partition Top anchors: 0.097-inch- thick metal plate with 3/8-inch- diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4-inch-thick by 24 inches long, with ends turned up 2 inches or with cross pins, unless otherwise indicated.
  - 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M Epoxy coating 0.020 inch thick.
- G. Adjustable Masonry-Veneer Anchors
  - 1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
    - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
  - 2. Adjustable High-Strength Systems: Truss type with super-heavy-duty eyelets and adjustable tab welded to side pods of 9 gauge or 3/16" wire. Adjustable wall ties are 3/16" diameter wire.

## 2.9 MISCELLANEOUS ANCHORS

- A. Unit Type Inserts in Concrete: Cast-iron or malleable-iron wedge-type inserts.
- B. Dovetail Slots in Concrete: Furnish dovetail slots with filler strips, of slot size indicated, fabricated from 0.034-inch, galvanized steel sheet.
- C. Anchor Bolts: Headed steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.
- D. Post installed Anchors: Provide torque-controlled expansion anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
  - 1. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).

2. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.

#### 2.10 EMBEDDED FLASHING MATERIALS

- Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where A. indicated, complying with Division 07 Section "Sheet Metal Flashing and Trim" and as follows:
  - Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch thick. 1.
  - Copper: ASTM B 370, Temper H00 or H01, cold-rolled copper sheet, 10-oz./sq. ft. weight 2. or 0.0135-inch-thick for fully concealed flashing; 16-oz./sq. ft. weight or 0.0216 inch thick elsewhere.
  - Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 3. feet. Provide splice plates at joints of formed, smooth metal flashing.
  - 4. Fabricate through-wall metal flashing embedded in masonry from copper, with ribs at 3inch intervals along length of flashing to provide an integral mortar bond. a.
    - Products:
      - Cheney Flashing Company; Cheney Flashing. 1)
      - 2) Keystone Flashing Company, Inc.: Keystone 3-Way Interlocking Thruwall Flashing.
  - 5. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
  - 6. Fabricate through-wall flashing with drip edge where indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
  - 7. Fabricate through-wall flashing with sealant stop where indicated. Fabricate by bending metal back on itself 3/4 inch at exterior face of wall and down into joint 3/8 inch to form a stop for retaining sealant backer rod.
  - 8. Fabricate metal drip edges for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.
  - 9. Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches into wall and 1/2inch out from wall, with outer edge bent down 30 degrees and hemmed.
  - Metal Flashing Terminations: Fabricate from stainless steel. Extend at least 3 inches into 10. wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 3/8 inch to form a stop for retaining sealant backer rod.
  - Metal Expansion-Joint Strips: Fabricate from copper to shapes indicated. 11.
- B. Flexible Flashing: For flashing not exposed to the exterior, use the following, unless otherwise indicated:
  - Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded with asphalt between 2 1. layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry. Products: a.
    - 1) Advanced Building Products Inc.; Copper Fabric Flashing.
    - AFCO Products Inc.; Copper Fabric. 2)
    - 3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
    - Phoenix Building Products: Type FCC-Fabric Covered Copper. 4)
    - Polytite Manufacturing Corp.; Copper Fabric Flashing. 5)
    - 6) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
    - 7) York Manufacturing, Inc.; York Copper Fabric Flashing.
- C. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from high-density polyethylene incorporating chemical stabilizers that prevent UV degradation. Cell flashing pans have integral weep spouts that are designed to be built into mortar bed joints and weep collected moisture to the exterior of CMU walls and that extend into the cell to prevent clogging with mortar.

- Product: Subject to compliance with requirements, provide "Blok-Flash" by Advanced 1. Building Products Inc.
- D. Solder and Sealants for Sheet Metal Flashings:
  - 1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
  - 2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
  - 3. Elastomeric Sealant: ASTM C 920, chemically curing urethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

#### MISCELLANEOUS MASONRY ACCESSORIES 2.11

- Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; A. compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- Β. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Weep/Vent Products: Use the following, unless otherwise indicated:
  - 1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard. a
    - Products:
      - 1) Advanced Building Products Inc.; Mortar Maze weep vent.
      - 2) Dayton Superior Corporation, Dur-O-Wal Division; Cell Vents.
      - 3) Heckmann Building Products Inc.; No. 85 Cell Vent.
      - 4) Hohmann & Barnard, Inc.; Quadro-Vent.
      - Wire-Bond; Cell Vent. 5)
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
  - Provide one of the following configurations: 1.
    - Strips, full-depth of cavity and 10 inches wide, with dovetail shaped notches 7 a. inches deep that prevent mesh from being clogged with mortar droppings.
    - Strips, not less than 3/4-inch-thick and 10 inches wide, with dimpled surface b. designed to catch mortar droppings and prevent weep holes from being clogged with mortar.
    - Sheets or strips full depth of cavity and installed to full height of cavity. c.
    - Sheets or strips not less than 3/4-inch-thick and installed to full height of cavity with d. additional strips 4 inches high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from being clogged with mortar.
  - 2. Products:
    - Advanced Building Products Inc.; Mortar Break II. a.
    - b. Archovations, Inc.; CavClear Masonry Mat.
    - Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop. c.
    - Mortar Net USA, Ltd.; Mortar Net. d.

- F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.
  - 1. Products:
    - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
    - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
    - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
    - d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

## 2.12 CAVITY-WALL INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C 1289, Type I (aluminum-foil-faced), Class 2 (glass-fiber-reinforced).
- B. Adhesive: Type recommended by insulation board manufacturer for application indicated.

## 2.13 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
  - 1. Manufacturers:
    - a. Diedrich Technologies, Inc.
    - b. EaCo Chem, Inc.
    - c. ProSoCo, Inc.

## 2.14 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. Limit cementitious materials in mortar to Portland cement and lime.
  - 3. Limit cementitious materials in mortar for exterior and reinforced masonry to Portland cement and lime.
  - 4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
  - 1. For masonry below grade or in contact with earth, use Type S.
  - 2. For reinforced masonry, use Type S.
  - 3. For mortar parge coats, use Type S.
  - 4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.
  - 5. For interior non-load-bearing partitions, Type S.

- D. Pigmented Mortar: Use colored cement product
  - 1. Pigments shall not exceed 10 percent of Portland cement by weight.
  - 2. Pigments shall not exceed 5 percent of masonry cement by weight.
  - 3. Mix to match Architect's sample.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
  1. Mix to match Architect's sample.
  - 1. With to match Architect's sample.
- F. Grout for Unit Masonry: Comply with ASTM C 476.
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  - 2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

### 2.15 SOURCE QUALITY CONTROL

- A. Engage a qualified independent testing agency to perform source quality-control testing indicated below:
  - 1. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.
- B. Clay Masonry Unit Test: For each type of unit furnished, per ASTM C 67.
- C. Concrete Masonry Unit Test: For each type of unit furnished, per ASTM C 140.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
  - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
  - 2. Verify that foundations are within tolerances specified.
  - 3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 INSTALLATION, GENERAL
  - A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
  - B. Build chases and recesses to accommodate items specified in this and other Sections.
  - C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
  - 1. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- H. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
  - 1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
  - 2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
  - 3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
  - 4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
  - 5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
  - 6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
  - 7. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

#### 3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

- F. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
  - 1. Install compressible filler in joint between top of partition and underside of structure above.
  - 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c., unless otherwise indicated.
  - 3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
  - 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section "Fire-Resistive Joint Systems."

### 3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick and concrete masonry units as follows:
  - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
  - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
  - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
  - 1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

#### 3.5 COMPOSITE MASONRY

- A. Bond wythes of composite masonry together using one of the following methods:
  - 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
    - a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
  - 2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
    - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.

- b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties.
- B. Bond wythes of composite masonry together using bonding system indicated on Drawings.
- C. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.
- D. Corners: Provide interlocking masonry unit bond in each wythe and course at corners, unless otherwise indicated.
  - 1. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.
- E. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
  - 1. Provide individual metal ties not more than 16 inches o.c.
  - 2. Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.
  - 3. Provide rigid metal anchors not more than 24 inches o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

## 3.6 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
  - 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 1.77 sq. ft. of wall area spaced not to exceed 16 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
    - a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
    - b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type ties to allow for differential movement regardless of whether bed joints align.
  - 2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
    - a. Where bed joints of both wythes align, tab-type reinforcement.
    - b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement.
    - c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement to allow for differential movement regardless of whether bed joints align.
  - 3. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.
- B. Bond wythes of cavity walls together using bonding system indicated on Drawings.
- C. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- D. Coat cavity face of backup wythe to comply with Section 07 26 10.
- E. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
  - 1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

#### 3.7 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
  - 1. Space reinforcement not more than 16 inches o.c.
  - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
  - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
    - a. Reinforcement above is in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

#### 3.8 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
  - 1. Provide an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
  - 2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
  - 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

#### 3.9 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in- plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
  - 1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
  - 2. Install preformed control-joint gaskets designed to fit standard sash block.
  - 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
  - 4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
- C. Form expansion joints in brick made from clay or shale as follows:
  - 1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
  - 2. Build flanges of factory-fabricated, expansion-joint units into masonry.
  - 3. Build in compressible joint fillers where indicated.
  - 4. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants."

- D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants," but not less than 3/8 inch.
  - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

### 3.10 LINTELS

- A. Install steel lintels where indicated.
- B. Provide concrete lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

## 3.11 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows, unless otherwise indicated:
  - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  - 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 4 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.
  - 3. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 4 inches, and 1-1/2 inches into the inner wythe.
  - 4. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 4 inches.
  - 5. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
  - 6. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
  - 7. Install metal drip edges with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
  - 8. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
  - 9. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
  - 10. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of

wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- E. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
  - 1. Use specified weep/vent products to form weep holes.
- F. Place pea gravel in cavities as soon as practical to a height equal to height of first course above top of flashing, but not less than 2 inches, to maintain drainage.
  - 1. Fill cavities full height by placing pea gravel in cavities as masonry is laid so that at any point masonry does not extend more than 24 inches above top of pea gravel.
- G. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.
- H. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.
  - 1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

## 3.12 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  - 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  - 2. Limit height of vertical grout pours to not more than 60 inches.

## 3.13 FIELD QUALITY CONTROL

- A. Inspectors: Engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.
  - 1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.
- B. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports:
  - 1. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.
- C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

- D. Clay Masonry Unit Test: For each type of unit provided, per ASTM C 67.
- E. Concrete Masonry Unit Test: For each type of unit provided, per ASTM C 140.
- F. Mortar Test (Property Specification): For each mix provided, per ASTM C 780. Test mortar for compressive strength.
- G. Grout Test (Compressive Strength): For each mix provided, per ASTM C 1019.
- H. Prism Test: For each type of construction provided, per ASTM C 1314 28 days.

## 3.14 PARGING

- A. Parge all cavity walls according to manufacturer's instructions.
- 3.15 REPAIRING, POINTING, AND CLEANING
  - A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
  - B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
  - C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
  - D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
    - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
    - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
    - 3. Protect adjacent stone and no masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
    - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
    - 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
    - 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
    - 7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

## 3.16 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

#### END OF SECTION

#### SECTION 05 12 00 STRUCTURAL STEEL FRAMING

#### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Structural steel.
  - 2. Grout.
- B. Related Sections:
  - 1. Section 01 40 00 Quality Requirements for independent testing agency procedures and administrative requirements.
  - 2. Section 03 30 00 Cast-In-Place Concrete for epoxy and adhesive anchor attachments.
  - 3. Section 05 31 00 Steel Decking for field installation of shear connectors through deck.
  - 4. Section 05 50 00 Metal Fabrications for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other metal items not defined as structural steel.
  - 5. Section 09 90 00 Painting for surface-preparation and priming requirements.

## 1.3 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- B. Heavy Sections: Rolled and built-up sections as follows:
  - 1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches.
  - 2. Welded built-up members with plates thicker than 2 inches. Column base plates thicker than 2 inches.

### 1.4 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering analysis by a qualified professional engineer in the state of the Project, to withstand loads indicated and comply with other information and restrictions indicated.
  - 1. Select and complete connections using typical details indicated and AISC's "Manual of Steel Construction, 13<sup>th</sup> Edition".
  - 2. Use LRFD; data are given at factored-load level.
- B. Moment Connections: Type FR, fully restrained.
- C. Lateral Force Resisting System Construction: See Contract Drawings.

#### 1.5 ACTION SUBMITTALS

- A. General:
  - 1. Submittals and shop drawings shall not be made by using reproductions of Contract Drawings.
  - 2. Submittals and shop drawings shall be submitted through General Contractor to Architect. Any fabrication of material before approval of drawings will be at the risk of Contractor.
    - a. Fabricated material and connections shall fit within architectural constraints.
    - b. Fabricator alone shall be responsible for errors of detailing and fabrication.
  - 3. Contractor shall provide a proposed submittal schedule showing anticipated steel shop drawing submission dates a minimum of two (2) weeks prior to the first steel shop drawing submittal.
  - 4. Steel submissions shall be submitted such that each individual construction sequence is a separate standalone submittal package with an Erection Plan, Assembly Drawings, and Piece Mark Drawings. Typical Details, Connections, Calculations and Sections may be submitted as one submittal package at Contractors option but must be received prior to the first sequence submission. Sequence submittals shall be submitted in the order that they will be Fabricated and Erected. Processing time for review of each sequence shall be allowed and shall not be assumed to be concurrent.
  - 5. Sequences larger than the floor area of the largest single floor of the building will require additional review and processing time. Additional review and processing time shall not be assumed to be concurrent. Any sequence anticipated to be larger than the maximum single floor area shall be clearly indicated in the submittal schedule and brought to the Architect's/Engineer's attention for discussion of review times prior to submission of said sequence.
- B. Product Data: For each type of product indicated.
- C. Delegated-Design Submittal for Connections: For structural-steel connections indicated to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Submit in advance of steel shop drawings. All connections shall be designed by the fabricator's engineer per AISC 303 section 3.1.2 Option 3.
  - 1. Proposed variations in typical details shown on drawings will be considered and such variations must have preliminary approval prior to preparation of detailed shop drawings.
  - 2. Connection drawings and details shall be prepared under supervision and sealed by a professional Engineer Registered in State of the project. Fabricator shall submit certification by professional Engineer that connection design is in accordance with applicable codes and specifications.
  - 3. Fabricator's engineer shall submit complete design calculations for each connection. Such calculations shall show details of assembled joint with bolts and welds required. Where predesigned connections are taken directly from tables in AISC Manual, calculations need not be submitted provided job design conditions precisely match those assumed in tables, data taken from tables is clearly identified with table number, and such connections are so indicated in calculations submitted. Design calculations shall be sealed by fabricator's registered professional engineer. Shop drawings submitted without complete design calculations will not be approved.

- D. Shop Drawings: Show fabrication of structural-steel components. Submit in advance of fabrication complete shop drawings prepared under the supervision of fabricator's registered professional Engineer for fabrication of each component part of structural steel framing.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Include member size, length, and camber.
  - 3. Include embedment Drawings.
  - 4. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
  - 5. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
  - 6. Include material specifications.
  - 7. Indicate piece marks for field assembly.
- E. Erection Drawings: Submit erection drawings ("E" Sheets) as part of shop drawings, showing complete information necessary for erection of each component part of structural steel framing.
  - 1. Indicate setting drawings, templates and directions for installation of anchor rods and other anchorage devices embedded in concrete or masonry work.
  - 2. Indicate dimensions for alignment and elevation of each member.
  - 3. Indicate location of members and attachments by match-marking of piece members.
  - 4. Indicate piece marks for field assembly.
  - 5. Include type and location of each field connection, including splices.
  - 6. Indicate required number and location of shear connectors on each member.
  - 7. Indicate details of each field connection or typical connection.
  - 8. Indicate size, length and type of bolts required in each field connection.
- F. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:
  - 1. Power source (constant current or constant voltage).
  - 2. Electrode manufacturer and trade name, for demand critical welds.
- G. Certificate of Conformance: Submit manufacturer's certificate of conformance and/or supporting Charpy V-Notch test reports for complete-joint-penetration weld filler metal where steel backer bars for CJP groove welded T and corner joints are elected by the Contractor to remain in place. Certificate of Conformance or testreports shall show filler metal has a specified Charpy V-Notch toughness of 20 ft-lbs. at 40 degrees F.
- 1.6 INFORMATIONAL SUBMITTALS
  - A. Qualification Data: For qualified Installer, fabricator, professional engineer, and testing agency.
  - B. Welding certificates.
  - C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
  - D. Mill test reports for structural steel, including chemical and physical properties.
  - E. Product Test Reports: For the following:
    - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.

- 2. Direct-tension indicators.
- 3. Tension-control, high-strength bolt-nut-washer assemblies.
- 4. Shear stud connectors.
- 5. Shop primers.
- 6. Non-shrink grout.
- F. Source quality-control reports.
- 1.7 QUALITY ASSURANCE
  - A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
  - B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.
  - C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
  - D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code Steel."
  - E. Comply with applicable provisions of the following specifications and documents:
    - 1. AISC 303 "Code of Standard Practice for Steel Buildings and Bridges,"
      - a. Section 3.1.2 and Section 3.3 is hereby modified by deletion of the "Commentary."
      - b. Section 3.3 is hereby modified by deletion as follows: "When discrepancies exist between structural Design Drawings and the architectural, electrical, or mechanical Design Drawings or Design Drawings for other trades, the structural Design Drawings shall govern."
      - c. Section 4.4 is hereby modified by deletion of the following: "These drawings shall be returned to the Fabricator within 14 calendar days." Also delete "Commentary" in same section.
    - 2. AISC 360 "Specification for Structural Steel Buildings" dated March 9, 2005.
    - 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
  - F. Preinstallation Conference: Conduct conference at Project site.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the site at such intervals to ensure uninterrupted progress of work.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
  - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- C. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
  - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
  - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.

3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

## 1.9 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

#### PART 2 - PRODUCTS

- 2.1 STRUCTURAL-STEEL MATERIALS
  - A. General: All structural steel materials to be domestically manufactured in the United states of America.
  - B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
  - C. See General Notes for Structural Steel ASTM designations and grades, u.n.o.
  - D. Welding Electrodes: Comply with AWS requirements.
- 2.2 BOLTS, CONNECTORS, AND ANCHORS
  - A. General:
    - 1. Bolts, connectors, and anchors shall be new and not be reused.
  - B. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers; all with plain finish.
    - 1. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with plain finish.
  - C. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold- finished carbon steel; AWS D1.1/D1.1M, Type B.
  - D. Headed Anchor Rods: See general notes for grades. Headed anchor rods shall be straight.
    - 1. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
    - 2. Plate Washers: ASTM A 36/A 36M carbon steel.
    - 3. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
    - 4. Finish: Plain.
  - E. Threaded Rods: See general notes for grades.
    - 1. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
    - 2. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
    - 3. Finish: Plain.

- F. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.
- G. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.
- H. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

## 2.3 PRIMER

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Primer: Comply with Section 09 90 00.
- C. Primer: Fabricator's standard lead- and chromate-free, no asphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
- D. Galvanizing Repair Paint: ASTM A 780.

#### 2.4 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, ready-to- use nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time. Grout shall have no drying shrinkage at any age.
  - 1. Non-metallic grout shall be used in all conditions unless noted otherwise.
  - 2. Compressive strength at 7 days: 6000 psi minimum.
  - 3. Compressive strength at 28 days: 8000 psi minimum.

## 2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
  - 1. Camber structural-steel members where indicated.
  - 2. Fabricate beams with rolling camber up.
  - 3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
  - 4. Mark and match-mark materials for field assembly.
  - 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
  - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, punch, or mechanically thermally cut standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning."
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
- G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wallopening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.
- H. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches (250 mm) o.c. unless otherwise indicated.
- I. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
  - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
  - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
  - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

## 2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

## 2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
  - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
  - 2. Surfaces to be field welded.
  - 3. Surfaces to be high-strength bolted with slip-critical connections.
  - 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
  - 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
  1. SSPC-SP 2, "Hand Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

- 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
- 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- D. Painting: Prepare steel and apply a one-coat, no asphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm).

## 2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
  - 1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
  - 2. Galvanize lintels and shelf angles attached to structural-steel frame and located in exterior walls, u.n.o.
  - 3. Galvanize all steel exposed to weather, u.n.o.

## 2.9 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
  - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
  - 1. Liquid Penetrant Inspection: ASTM E 165.
  - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
  - 3. Ultrasonic Inspection: ASTM E 164.
  - 4. Radiographic Inspection: ASTM E 94.
- E. Full Penetration Welded Connections: In addition to visual inspection, complete joint penetration groove welds shall be ultrasonically tested for the entire weld length, in each designated joint per AWS D1.1 to the following extents:
  - 1. 100 percent of welds splicing beams, girders, columns, or braces.
  - 2. 100 percent of column to base plate welds at rigid (lateral) column frame bases.
  - 3. 100 percent of CJP beam to column welds, continuity plate welds, and shear tabs.
- F. Non-Destructive Testing of Welds:
  - 1. Ultrasonic Testing (UT): ASTM E164
    - a. Divide connections into groups containing not less than 40 connections. Test 25 percent of the connections in each group. If any weld is rejected, test all the connections in group.
- G. In addition to visual inspection, perform magnetic particle testing for full length of fillet welds on continuity plates and backing bar removal areas, and 25% of remaining fillet welds.

- H. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
  - 1. Bend tests will be performed if visual inspections reveal either a less-thancontinuous 360-degree flash or welding repairs to any shear connector.
  - 2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedment's for compliance with requirements.
  - 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
  - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.
- B. Templates shall be provided and be securely in place to preclude misplacements of anchor rods. Rods shall be installed at locations and with projections established by approved structural steel shop drawings. Subsequent displacement of anchor rods is the responsibility of the General Contractor.

## 3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.
  - 1. Set base and bearing plates for structural members level and to proper alignment with shim packs unless noted otherwise on the Contract Documents. Fabricator shall provide shim packs.
  - 2. Weld plate washers to top of baseplate.
  - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
  - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  - 1. Level and plumb individual members of structure.
  - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

## 3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
  - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth. Backing bars MUST be removed if the project is in Seismic Design Category C and D. Contractor may elect to leave backing bars in place for all other projects if all following requirements are met:
    - a. Manufacturer shall submit a Certificate of Conformance and supporting Charpy V-Notch test reports showing filler metal used for backing bars has a toughness of 20 ft-lbs. at 40 degrees F.
    - b. Certificate shall be received by the Engineer prior to the start of steel erection.
  - 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

## 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field quality control and testing, including special inspections required by local building codes and the International Building Codes.
- B. General Field Inspection:
  - 1. Verify location and setting of anchor rods by witness of Contractor's final check prior to setting of steel members.

- 2. Verify plumbness of columns is within allowable tolerance per AISC Code and Commentary.
- 3. Verify that bracing and guying/cables, if required to secure framing during erection, are installed.
- C. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
  - 1. Minimum inspection requirements using the stated publication are as follows:
    - a. All bolts indicated to be "slip-critical" shall be inspected.
    - b. Two bolts in each bearing type bolted connection between girders and columns shall be inspected.
    - c. 10 percent of the remaining bolts, but not less than 2 in each connection shall be inspected.
  - 2. Bolts that fail shall be retightened and all remaining bolts in the connection shall be retested. Costs of retests on connections that fail shall be the Contractor's responsibility.
- D. Welded Connections: Field welds will be visually inspected according AWS D1.1/D1.1M.
  - 1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
    - a. Liquid Penetrant Inspection: ASTM E 165.
    - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
    - c. Ultrasonic Inspection: ASTM E 164.
    - d. Radiographic Inspection: ASTM E 94.
  - 2. In addition to visual inspection, 100 percent of full-penetration, moment connection field welds shall be ultrasonically tested according to AWS D1.1.
  - 3. Column splice welds shall be inspected by ultrasonic testing per AWS D1.1 to the following extent:
    - a. Rigid (Lateral) Columns: 100% of splice welds at each level shall be tested.
    - b. Non-Frame Columns: 25% of splice welds at each level shall be tested.
  - 4. Non-Destructive Testing of Remaining Welds:
    - a. Ultrasonic Testing (UT): ASTM E164
      - 1) Divide connections into groups containing not less than 40 connections. Test 25 percent of the connections in each group. If any weld is rejected, test all the connections in group.
  - 5. Extent of testing procedure shall be the entire weld length in each designated joint.
  - 6. Welds found unacceptable shall be repaired by methods permitted in AWS code and be retested. Costs of repair and additional testing shall be the Contractor's responsibility.
- E. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
  - 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360- degree flash or welding repairs to any shear connector.
  - 2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.
- F. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
# 3.6 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Cleaning and touchup painting are specified in Section 09 90 00.

#### SECTION 05 30 00 ER6.5A METAL DECK

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. The requirements of this specification section include all materials, equipment, and labor necessary to furnish and install an ER6.5A-18/18 gage acoustical roof deck.
- B. ER6.5A-18/18 gage acoustical roof deck shall serve as a structural roof deck and a finished ceiling as indicated on the contract drawings.
- C. ER6.5A-18/18 gage acoustical roof deck shall provide an exposed bottom surface that is substantially flat. The narrow rib openings of the ER6.5A-18/18 gage acoustical roof deck shall provide the appearance of a linear ceiling. Fasteners for side laps and overlying roofing materials shall be concealed within the depth of the dovetail shaped ribs.
- D. Ankore<sup>™</sup> hanging devices that are specially configured to fit into the dovetail shaped ribs of the ER6.5A-18/18 gage acoustical roof deck shall be available. These hanging devices shall be utilized whenever any related work is suspended from ER6.5A-18/18 gage acoustical roof deck. Ankore<sup>™</sup> hanging devices shall be furnished by the installer of the related work unless otherwise indicated.

#### 1.2 RELATED WORK

- A. The following related work is not part of this specification section:
  - 1. Section 05 12 00 Structural Steel Framing.
  - 2. Section 07 54 19 Polyvinyl-Chloride PVC-TPA Roofing.
  - 3. Division 23 Mechanical.
  - 4. Division 26 Electrical.

#### 1.3 SUBMITTALS

- A. Submit the following items with the conditions of the contract and appropriate specification sections:
  - 1. The manufacturer's specifications, section properties, load tables, diaphragm shear tables, dimensions, finishes, and noise reduction coefficients shall be submitted.
  - 2. Shop drawings shall be submitted showing panel placement, profiles, material thicknesses, finishes, layout, anchorage and openings as dimensioned on the structural drawings.
  - 3. A full width sample shall be submitted as requested to verify compliance with the specifications and the level of quality.

#### 1.4 REFERENCE STANDARDS

- A. Section properties shall be computed in accordance with the American Iron and Steel Institute (AISI) Specification for Design of Cold-Formed Steel Structural Members.
- B. Welding shall comply with the applicable provisions of the American Welding Society (AWS) D1.3 Structural Welding Code-Sheet Steel.
- C. Superimposed load and diaphragm shear capacities shall be computed in accordance with the requirements of the Steel Deck Institute (SDI).

#### ER6.5A METAL DECK

- D. The manufacturer shall have been regularly engaged in the production of a deck section with dovetail shaped ribs for a period of at least ten years.
- E. Noise reduction coefficients shall be verified by the result of sound absorption tests conducted in accordance with ASTM C423 and E795.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. The ER6.5A-18/18 gage acoustical roof deck shall be protected from damage during delivery, storage, and handling.
- B. If storage at the jobsite is required, ER6.5A-18/18 gage acoustical roof deck shall be elevated above the ground, sloped to provide drainage, and protected from the weather with a ventilated covering.

# 1.6 SUBSTITUTION

- A. Reference in the specification to any product, material, type or form of construction shall establish the minimum standard of quality and performance. These standards shall not be abridged or modified for any reason for the purpose of substitution.
- B. The contractor shall submit any proposed substitution in writing to the Architect of Record for consideration no less than ten calendar days prior to the original bid date. The substitution proposal package shall include, at the architect's option, a sample product, structural and performance data, and finish description. Refer to Section 01 33 00.
- C. This data will be coordinated and reviewed by the project design professionals. Acceptance of any submitted substitution will be so stated and defined by addendum prior to the original bid date. Substitution without addendum is not accepted.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURER

- A. In accordance with the requirements of this specification section, provide products manufactured by EPIC METALS CORPORATION, Rankin, PA. Contact Scott Short, District Sales Manager; Telephone 412-351-3913, Fax 412-351-2018, Email sshort@epicmetals.com.
- B. The type ER6.5A-18/18 gage acoustical roof deck, design thickness, section properties, and NRC shall be shown on the structural design drawings.

# 2.2 MATERIAL

- A. The ER6.5A-18/18 gage acoustical roof deck shall be cold-formed from steel coils conforming to ASTM A653, structural quality, with a minimum yield strength of 40 ksi.
- B. Before forming, the steel coils shall have received a hot-dip protective coating of zinc conforming to ASTM A924, Class G60, as defined in ASTM A653.
- C. The minimum uncoated thickness of the steel furnished shall not be less than 95% of the design thickness.
- D. To conform with the requirements of the Green Building Rating System of the United States Green Building Council, the ER6.5A-18/18 gage acoustical roof deck shall contribute to the LEED accreditation for Regional Manufacturing proximity under the

Materials and Resources (MR) Section and Credit 5.1 and 5.2 Subsections by supplying product manufactured with a 500-mile radius of this specified project.

## 2.3 FABRICATION

- A. ER6.5A-18/18 gage acoustical roof deck shall have continuous dovetail shaped ribs.
- B. ER6.5A-18/18 gage acoustical roof deck shall have full depth positive registering side laps that can be fastened by welds or screws.
- C. ER6.5A-18/18 gage acoustical roof deck shall be fabricated with perforations. The perforated areas shall be located in the bottom flat areas between the dovetail shaped ribs. A minimum NRC value of 1.00 shall be provided. This value shall be established by sound absorption tests without the use of fiberglass insulation above the panels.
- D. After forming and welding, the bottom surfaces of type ER6.5A-18/18 gage acoustical roof deck shall be prime painted with Epic's standard white. Before painting, the galvanized steel shall be chemically cleaned and coated with an acid wash pretreatment primer followed by a coat of the manufacturer's standard prime paint and then oven baked. Compatibility of the field applied finish paint with the factory applied prime paint shall be the responsibility of the painting contractor.

#### 2.4 ACCESSORIES

- A. Ankore<sup>™</sup> hanging devices shall be installable and relocatable along the length of the interior ribs of the ER6.5A-18/18 gage acoustical roof deck. The manufacturer's product data shall be consulted for minimum spacing, load capacities, and proper installation procedure of the Ankore<sup>™</sup> hanging devices.
- B. The manufacturer's standard ridge plates, valley plates, transition plates, and closures shall be provided as indicated on the structural drawings.
- C. Openings and reinforcement for openings noted specifically by the deck manufacturer on the structural drawings shall be provided.
- D. Acoustic elements shall be factory installed above the perforations in the bottom flat area between the dovetail shaped ribs. To facilitate field painting of the perforated surfaces, the sound absorbing elements shall be supported above the surface. Sound absorbing elements and spacers shall be factory installed.
- E. Access Panels: Refer to drawings for locations. Provide access panels to run electrical and data wire in panel ribs. Panels shall be located near steel structure.

#### PART 3 - EXECUTION

#### 3.1 GENERAL

A. The ER6.5A-18/18 gage acoustical roof deck shall be installed in strict accordance with the manufacturer's instructions, approved erection drawings, and all applicable safety regulations.

#### 3.2 BEFORE INSTALLATION

A. The supporting frame and other work relating to the ER6.5A-18/18 gage acoustical roof deck shall be examined to determine if this work has been properly completed.

- B. Bundles of material shall be located on the supporting frame in such a manner that overloading of any individual framing members does not occur.
- C. All components of the ER6.5A-18/18 gage acoustical roof deck shall be protected from significant damage during shipment and handling. If storage at the jobsite is required, bundles or packages of these materials shall be elevated above the ground, sloped to provide drainage, and protected from the elements with a ventilated, waterproof covering.

## 3.3 INSTALLATION

- A. Before being permanently fastened, ER6.5A-18/18 gage acoustical roof deck shall be placed on the supporting frame and adjusted to final position with ends accurately aligned and adequately bearing on the supporting frame. Consistent coverage shall be maintained so that panels located in adjacent bays will be properly aligned.
- B. Cutting of ER6.5A-18/18 gage acoustical roof deck to suit jobsite conditions shall be performed in a neat and professional manner. Only those openings indicated on the structural drawings shall be cut. Other openings shall be cut and reinforced by those requiring the openings as approved by the structural engineer.
- C. The ER6.5A-18/18 gage acoustical roof deck shall be fastened to all supporting members with 3/4" diameter puddle welds at a nominal spacing of 8" on center or less or as indicated on the manufacturer's erection drawings.
  - 1. The sides of ER6.5A-18/18 gage acoustical roof deck located at the perimeter of the building shall be fastened to supporting members with 3/4" diameter puddle welds at a maximum spacing of 36" on center or less as indicated on the manufacturer's erection drawings.
- D. The side laps of ER6.5A-18/18 gage acoustical roof deck shall be fastened together with 1 1/2" long fillet welds or #12 screws as indicated on the manufacturer's erection drawings.
- E. Construction loads shall not be applied to ER6.5A-18/18 gage acoustical roof deck until after the panels are permanently fastened to supporting members, and side laps are attached. The construction loads shall not exceed the capacity of the panels.
- F. Items such as ceilings, light fixtures, conduit, pipe and ductwork shall not be suspended from ER6.5A-18/18 gage acoustical roof deck without specific approval of the structural engineer.
- G. Sump pans, ridge plates, valley plates, transition plates, eave plates, and supplied reinforcement for small openings shall be fastened as indicated on the manufacturer's erection drawings.

## 3.4 AFTER INSTALLATION

- A. Construction loads that could damage the ER6.5A-18/18 gage acoustical roof deck such as heavy concentrated loads and impact loads shall be avoided. Planking shall be used in all high traffic areas.
- B. Galvanizing and other coatings that are damaged must be field repaired using appropriate methods and shall be the responsibility of the contractor.
- C. Cleaning the bottom surface of the ER6.5A-18/18 gage acoustical roof deck for field painting shall be the responsibility of the contractor.

# SECTION 05 31 00 STEEL DECKING

## PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Roof deck.
- B. Related Requirements:
  - 1. Section 05 12 00 Structural Steel Framing for shop- and field-welded shear connectors.
  - 2. Section 05 50 00 Metal Fabrications for framing deck openings with miscellaneous steel shapes.
  - 3. Section 09 90 00 Painting for repair painting of primed deck and finish painting of deck.

# 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings:
  - 1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

# 1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product Certificates: For each type of steel deck.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
  1. Power-actuated mechanical fasteners.
- D. Evaluation Reports: For steel deck.
- E. Field quality-control reports.

# 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code Sheet Steel."

C. FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

# 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

# PART 2 - PRODUCTS

# 2.1 PERFORMANCE REQUIREMENTS

- A. General: All structural steel materials to be domestically manufactured in the United States of America.
- B. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- C. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- D. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- E. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

# 2.2 ROOF DECK

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. ASC Profiles, Inc.; a Blue Scope Steel company.
  - 2. Canam United States; Canam Group Inc.
  - 3. CMC Joist & Deck.
  - 4. Consolidated Systems, Inc.; Metal Dek Group.
  - 5. Cordeck.
  - 6. DACS, Inc.
  - 7. Epic MetalsCorporation.
  - 8. Marlyn Steel Decks, Inc.
  - 9. New Millennium Building Systems, LLC.
  - 10. Nucor Corp.; Vulcraft Group.
  - 11. Roof Deck, Inc.
  - 12. Valley Joist; Subsidiary of EBSCO Industries, Inc.
  - 13. Verco Manufacturing Co.
  - 14. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

- B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
  - 1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230) G90 (Z275) zinc coating.
  - Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230) G90 (Z180) zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
     a. Color: Manufacturer's standard.
  - 3. Deck Profile: As indicated in the documents.
  - 4. Profile Depth: As indicated in the documents.
  - 5. Design Uncoated-Steel Thickness: As indicated in the documents.
  - 6. Span Condition: Triple span or more.
  - 7. Side Laps: Overlapped or interlocking seam at Contractor's option.

#### 2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon- steel screws, No. 10 (4.8-mm) minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 31 for overhang and slab depth.
- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- I. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.
- J. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck, with 3-inch- (76-mm-) wide flanges and level or sloped recessed pans of 1-1/2-inch (38-mm) minimum depth. For drains, cut holes in the field.
- K. Galvanizing Repair Paint: ASTM A 780.
- L. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

#### PART 3 – EXECUTION

## 3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 INSTALLATION, GENERAL
  - A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
  - B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
  - C. Locate deck bundles to prevent overloading of supporting members.
  - D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
  - E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
  - F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
  - G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
  - H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
  - I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

#### 3.3 ROOF-DECK INSTALLATION

- A. Deck attachment shall be sufficient to develop diaphragm shear strength capacity indicated on the drawings and shall be in accordance with the manufacturer's recommendations. Attachment guidelines indicated in sections 3.3B through 3.3D are minimum requirements only.
- B. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches (38 mm) long, and as follows:
  - 1. Weld Diameter: 5/8-inch, nominal.
  - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 12 inches in the field of roof and 6 inches (150 mm) apart in roof corners and perimeter, based on roof-area definitions in FMG Loss Prevention Data Sheet 1-28.

- 3. Weld Washers: Install weld washers at each weld location where metal thickness is less than 0.028 inches. Weld washers shall have a minimum thickness of 0.0598 inches and have a nominal 3/8-inch diameter whole.
- C. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span, 36 inches, and a minimum of 4 fasteners between supports. Use one of the two attachment methods as follows:
  - 1. Mechanically fasten with self-drilling, No. 10 (4.8-mm-) diameter or larger, carbonsteel screws.
  - 2. Fasten with a minimum of 1-1/2-inch- (38-mm-) long welds.
- D. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 2 inches (38 mm), with end joints as follows:
  - 1. End Joints: Lapped 2 inches (51 mm) minimum or butted at Contractor's option.
- E. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld or mechanically fasten flanges to top of deck. Space welds or mechanical fasteners not more than 12 inches (305 mm) apart with at least one weld or fastener at each corner.
  - 1. Install reinforcing channels or zees in ribs to span between supports and weld or mechanically fasten.
- F. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
  - 1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.
- G. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.
- 3.4 FIELD QUALITY CONTROL
  - A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
  - B. Field welds will be subject to inspection.
  - C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
  - D. Remove and replace work that does not comply with specified requirements.
  - E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.
- 3.5 **PROTECTION** 
  - A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
  - B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation and apply repair paint.

- 1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
- 2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Section 09 90 00 Painting.
- C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

# SECTION 05 40 00 COLD FORMED METAL FRAMING

#### PART 1 GENERAL

## 1.1 SECTION INCLUDES

A. Load bearing formed steel stud exterior wall framing.

# 1.2 RELATED SECTIONS

- A. Section 05 12 00 Structural Steel Framing.
- B. Section 05 31 00 Steel Decking: Metal floor and roof decking.
- C. Section 06 11 40 Wood Blocking and Curbing: Rough wood blocking.
- D. Section 07 21 00 Thermal Insulation: Insulation within framing members.
- E. Section 07 90 00 Joint Protection.
- F. Section 09 11 10 Metal Stud Framing System.
- G. Section 09 26 00 Gypsum Board Systems: Light weight, non-load bearing metal stud framing.
- H. Section 09 51 23 Acoustical Tile Ceilings: Ceiling suspension system.

#### 1.3 REFERENCES

- A. AISI American Iron and Steel Institute Cold-Formed Steel Design Manual.
- B. ASTM A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A653 Sheet Steel, Zinc-coated (Galvanized) by Hot Dip Process.
- D. ASTM A1011 Hot-Rolled Carbon Steel Sheet and Strip.
- E. ASTM A1008 Steel, Cold-Rolled Sheet carbon, Structural.
- F. ASTM C955 Load-Bearing (Transverse and Axial) Steel Studs, Runners (Track), and Bracing or Bridging, for Screw Application of Gypsum Board and Metal Plaster Bases.
- I. AWCI (Association of Wall and Ceiling Industries) Specifications Guide for Cold Formed Steel Structural Members.
- J. AWS D1.1 Structural Welding Code.
- K. AWS D1.3 Light Steel Welding Code.
- L. SSPC (Steel Structures Painting Council) Steel Structures Painting Manual.
- M. MFMA (Metal Framing Manufacturers Association) Guidelines for the Use of Metal Framing.

#### 1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

#### COLD FORMED METAL FRAMING

- B. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, type and location of fasteners, and accessories or items required of related work.
- C. Indicate stud and roof joist layout sealed and signed by a qualified registered professional structural engineer licensed in the State of Maryland.
  - 1. Indicated description of design criteria
  - 2. Engineering analysis depicting member stresses and deflection.
  - 3. Member sizes, gauges and connections.
  - 4. Member truss support reactions.
  - 5. Top chord, bottom chord and web tracing requirements.
- D. Describe method for securing studs to tracks and for bolted or welded framing connections.
- E. Product Data: Provide data on standard framing members; describe materials and finish, product criteria and limitations.
- F. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- G. Delegated Design Submittal: For cold formed metal framing indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Show cold formed metal framing types, connections, types of bracing including special reinforcement. Indicate location, type, magnitude and direction of loads imposed on the building structural frame from cold formed metal framing.

# 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum five (5) years documented experience and approved by manufacturer.

#### 1.6 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

#### 1.7 COORDINATION

- A. Coordinate work under provisions of Section 01 31 00.
- B. Coordinate with the placement of components within the stud framing system.

# PART 2 PRODUCTS

- 2.1 MANUFACTURERS
  - A. Marino Industries Corp of South Plainfield, NJ
  - B. ClarkDietrich Building Systems of Baltimore, MD
  - C. Substitutions: Under provisions of the General Conditions to the Contract for Construction.

#### 2.2 FRAMING MATERIALS

- A. Studs: ASTM C955, formed to channel shape, solid web, knurled faces; 16 gage thick minimum, 1 5/8-inch face and 6-inch depth. Final gage to be determined through Delegated Design. Submit engineering stamped drawings for any substitution.
- B. Joists: Grade sheet steel, formed to channel shape, punched web; 16 gage thick, 1 1/2-inch face, 10-inch depth.
- C. Track: Formed steel; channel shaped; same width as studs, tight fit; 16 gage thick, solid web.

# 2.3 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered.
- B. Plates, Gussets, Clips: Formed sheet steel, thickness determined for conditions encountered.
- C. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic zincrich.

# 2.4 FASTENERS

- A. Self-drilling, Self-tapping Screws, Bolts, Nuts and Washers: ASTM A123, hot dip galvanized to 1.25 oz/sq. ft.
- B. Anchorage Devices: Drilled expansion bolts.
- C. Welding: In conformance with AWS D1.1 and AWS D1.3.

# 2.5 FABRICATION

- A. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.
- B. Fit and assemble in largest practical sections for delivery to site, ready for installation.

#### 2.6 FINISHES

- A. Studs: Galvanize to CP 60 coating class.
- B. Tracks and Headers: Galvanize to CP 60 coating class.
- C. Joists: Galvanize to CP 60 coating class.
- D. Bracing, Furring, Bridging: Same finish as framing members.
- E. Plates, Gussets, Clips: Same finish as framing members.

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01 31 00.
- B. Verify that building framing components are ready to receive work.

# COLD FORMED METAL FRAMING

#### 3.2 ERECTION OF STUDDING

- A. Install components in accordance with manufacturer's instructions.
- B. Align floor and ceiling tracks; locate to partition layout. Secure in place with fasteners by welding at maximum 24 inches oc. Coordinate installation of sealant with floor and ceiling tracks.
- C. Place studs at 16 inches o.c. or 12" o.c. within 6'-0" of corners; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.
- D. Construct corners using minimum three studs. Double stud wall openings, door and window jambs.
- E. Erect load bearing studs one-piece full length. Splicing of studs is not permitted.
- F. Erect load bearing studs, brace, and reinforce to develop full strength, to achieve design requirements.
- G. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- H. Install intermediate studs above and below openings to align with wall stud spacing.
- I. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- J. Attach cross studs to studs for attachment of fixtures anchored to walls.
- K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- L. Touch-up field welds and damaged galvanized surfaces with primer.

#### 3.3 ERECTION OF JOISTS

- A. Install framing components in accordance with manufacturer's instructions.
- B. Make provisions for erection stresses. Provide temporary alignment and bracing.
- C. Place joists as indicated at 16 inches o.c.; not more than 2 inches from abutting walls. Connect joists to supports using fastener method.
- D. Set floor joists parallel and level, with lateral bracing and bridging.
- E. Locate joist end bearing directly over load bearing studs or provide load distributing member to top of stud track.
- F. Provide web stiffeners at reaction points.
- G. Touch-up field welds and damaged galvanized surfaces with zinc rich primer.

#### 3.4 ERECTION TOLERANCES

- A. Maximum Variation from True Position: 1/4 inch in ten (10') feet.
- B. Maximum Variation of any Member from Plane: 1/8 inch.

#### SECTION 05 50 00 METALFABRICATIONS

#### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

A. Shop fabricated ferrous metal items, galvanized and prime painted.

# 1.2 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 03 30 00 - Cast-In-Place Concrete: Placement of metal fabrications in concrete.

C. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.

#### 1.3 RELATED SECTIONS

- A. Section 05 12 00 Structural Steel: Structural steel column anchor bolts.
- B. Section 05 30 00 ER6.5 Steel Deck.
- C. Section 05 31 00 Steel Decking: Bearing plates and angles and frame openings for metal deck bearing, including anchorage.
- D. Section 05 73 00 Handrails and Railings.
- E. Section 09 90 00 Painting: Paint finish.

# 1.4 **REFERENCES**

- A. ASTM A36 Structural Steel.
- B. ASTM A53 Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
- C. ASTM A123 Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip.
- D. ASTM A153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- E. ASTM A283 Carbon Steel Plates, Shapes, and Bars.
- F. ASTM A307 Carbon Steel Externally Threaded Standard Fasteners.
- G. ASTM A325 High Strength Bolts for Structural Steel Joints.
- H. ASTM A386 Zinc-Coating (Hot-Dip) on Assembled Steel Products.
- I. ASTM A500 Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- J. ASTM A501 Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- K. ASTM B177 Chromium Electroplating on Steel for Engineering Use.
- L. AWS A2.0 Standard Welding Symbols.

#### METAL FABRICATIONS

- M. AWS D1.1 Structural Welding Code.
- N. SSPC Steel Structures Painting Council.

#### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- 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.
- C. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

#### 1.6 QUALIFICATIONS

A. Welders' Certificates: Submit under provisions of Section 01 33 00, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

## 1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on Drawings and shop drawings.

#### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Steel Sections: ASTM A36.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Plates: ASTM A283.
- D. Pipe: ASTM A53, Grade B Schedule 40.
- E. Fasteners: As detailed.
- F. Bolts, Nuts, and Washers: ASTM A325 galvanized to ASTM A153 for galvanized components.
- G. Welding Materials: AWS D1.1; type required for materials being welded.
- H. Shop and Touch-Up Primer: SSPC 6 SP6 Commercial Blast Cleaning and Prime.
- I. Touch-Up Primer for Galvanized Surfaces: PPG Zinc rich type 6-209 galvanized steel primer.

#### 2.2 FABRICATION

- A. Fit and shop assemble 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.

# 2.3 FINISHES

- A. Prepare surfaces to be primed in accordance with SSPC SP 6- Commercial Blast Cleaning.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with PPG Water Base Inhibitive Metal Primer 90-712 at 4.8 mils MWF.
- D. Galvanize in accordance with ASTM A123, structural steel members. Provide minimum 1.25 oz/sq. ft galvanized coating.

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

# 3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.

#### 3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components indicated on Drawings and shop drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain Architect/Engineer approval prior to site cutting or making adjustments not scheduled.
- F. After erection, clean, brush and prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

## 3.4 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset from True Alignment: 1/4 inch.

## 3.5 SCHEDULE

- A. The Schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.
  - 1. Bollards: Steel pipe, concrete filled, crowned cap; galvanized with painted finishes. Omit quenching process of steel for adequate paint adhesion. Match adjacent bollard, 8" minimum dia., 3' H and 3' below grade.
  - 2. Ledge and Shelf Angles, Channels and Plates Not Attached to Structural Framing: For support of metal decking joists masonry; prime paint finish.
  - 3. Lintels: As detailed; Interior: prime paint finish; Exterior: galvanized finish.
  - 4. Support steel and bracing for ceiling hung toilet partitions as detailed within contract documents. Prepare in accordance with SS PC-6-SP6 and prime paint.
  - 5. TV Support Brackets: Tube steel supports as detailed on drawings.
  - 6. Roof Deck Closer Channels.

# SECTION 05 73 00 HANDRAILS AND RAILINGS

## PART 1 – GENERAL

## 1.01 SCOPE OF WORK

A. Architectural glass railings.

## 1.02 RELATED WORK

- A. Section 03 30 00 Cast-in-Place Concrete.
- B. Section 08 80 00 Glazing.
- C. Section 09 65 00 Resilient Base and Accessories.
- D. Section 09 30 00 Tiling.
- E. Section 09 90 00 Painting.

# 1.03 REFERENCES

- A. Aluminum Association (AA):
  - 1. AA ABH-21 Aluminum Brazing Handbook.
  - 2. AA ASD-1 Aluminum Standards and Data.
  - 3. AA DAF-45 Designation System for Aluminum Finishes.
  - 4. AA SAA-46 Standards for Anodized Architectural Aluminum.
- B. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 605.1 Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
  - 2. AAMA 606.1 Voluntary Guide Specifications and Inspection Methods of Integral Color Anodic Finishes for Architectural Aluminum.
  - 3. AAMA 607.1 Voluntary Guide Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
  - 4. AAMA 608.1 Voluntary Guide Specifications and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum.
- C. American Concrete Institute (ACI):
  - 1. ACI 347 Recommended Practice for Concrete Formwork.
- D. American Institute of Steel Construction (AISC):
  - 1. Manual of Steel Construction.
- E. American Iron and Steel Institute (AISI):
  - 1. Steel Products Manual; Stainless and Heat Resisting Steel.
  - 2. Code of Standard Practice.
- F. American National Standards Institute (ANSI):
  - 1. ANSI A21.1 Safety Requirements for Floor and Wall Openings, Railings and Toe Boards.
  - 2. ANSI A58.1 Minimum Design Loads in Buildings and Other Structures.
  - 3. ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities.
  - 4. ANSI A97.1 Safety Performance Specifications and Methods of Test for Safety Glazing Material used in Buildings.
  - 5. ANSI/NAAMM MBG 531 Metal Bar Grating Manual.

- G. ASTM International (ASTM):
  - 1. ASTM A 29 Specification for Steel Bars, Carbon and Alloy, Hot-Wrought and Cold-Finished, General Requirements for.
  - 2. ASTM A 36 Carbon Structural Steel.
  - 3. ASTM A 47 Specification for Ferritic Malleable Iron Castings.
  - 4. ASTM A 48 Specification for Gray Iron Castings.
  - 5. ASTM A 53 Pipe, Steel, Black and Hot Dipped, Zinc Coated Welded and Seamless.
  - 6. ASTM A 108 Steel Bars, Carbon, Cold Finished, Standard Quality.
  - 7. ASTM A 123 Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
  - 8. ASTM A 167 Specification for Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - 9. ASTM A 269 Specification for Seamless and Welded Austenitic Stainless-Steel Tubing for General Service.
  - 10. ASTM A 276 Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
  - 11. ASTM A 312 Specification for Seamless and Welded Austenitic Stainless-Steel Pipe.
  - 12. AŜTM A 500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
  - 13. ASTM A 512 Specification for Cold-Drawn Butt-weld Carbon Steel Mechanical Tubing.
  - 14. ASTM A 513 Specification for Electric-Resistance-Welded Carbon and Alloy Steel Tubing.
  - 15. ASTM A 554 Welded Stainless-Steel Mechanical Tubing
  - 16. ASTM A 570 Specification for Steel, Sheet and Strip, Carbon, Hot Rolled, Structural Quality.
  - 17. ASTM A 575 Specification for Steel Bars, Carbon, Merchant Quality, M Grades.
  - 18. ASTM A 582 Free Machining Stainless and Heat Resisting Steel Bars.
  - 19. ASTM A 743 Specification for Corrosion-Resistant Iron Chromium, Iron Chromium-Nickel, and Nickel Base Alloy Castings for General Application.
  - 20. ASTM A1264-1 Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems
  - 21. ASTM B 43 Specification for Standard Sizes of Seamless Red Brass Pipe.
  - 22. ASTM B 62 Specification for Composition Bronze or Ounce Metal Castings.
  - 23. ASTM B 209 Specification for Aluminum and Aluminum Alloy Sheet and Plate.
  - 24. ASTM B 210 Specification for Aluminum and Aluminum Alloy Drawn Seamless Tubes.
  - 25. ASTM B 211 Aluminum and Aluminum Alloy Bar, Rod and Wire
  - 26. ASTM B 221 Specification for Aluminum-Alloy Bars, Rods, Wires, Shapes and Tubes
  - 27. ASTM B 241 Specification for Aluminum and Aluminum Alloy Seamless Pipe and Seamless Extruded Tube.
  - 28. ASTM B 429 Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
  - 29. ASTM B 455 Specification for Copper-Zinc-Lead Alloy (Leaded Brass) Extruded Shapes.
  - 30. ASTM B 483 Specification for Aluminum and Aluminum-Alloy Drawn Tubes for General Purpose Applications.
  - 31. ASTM B 584 Specification for Copper Alloy Sand Castings for General Applications.
  - 32. ASTM C 595 Specification for Blended Hydraulic Cements.
  - 33. ASTM C 1036 Standard Specification for Flat Glass.
  - 34. ASTM C 1048 Standard Specification for Heat Treated Flat Glass Kind HS, Kind FT Coated and Uncoated Glass.
  - 35. ASTM C 1172 Standard Specification for Laminated Architectural Flat Glass.

- 36. ASTM D 1730 Recommended Practices for Preparation of Aluminum and Aluminum Alloy Surfaces for Painting.
- 37. ASTM E 84 Test Method for Surface Burning Characteristics of Building Materials.
- 38. ASTM E 894 Standard Test Methods for Anchorage of Permanent Metal Railing Systems and Rails for Buildings.
- 39. ASTM E 935 Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
- 40. ASTM E 985 Specification for Permanent Metal Railing Systems and Rails for Buildings.
- 41. ASTM E 1300 Standard Practice for Determining Load Resistance of Glass in Buildings.
- 42. ASTM E 1481 Terminology of Railing Systems in Rails for Buildings.
- 43. ASTM E 2353 Standard Test Methods for Performance of Glass in Permanent Glass Railing Systems, Guards & Balustrades.
- 44. ASTM E 2358 Standard Specification for Performance of Glass in Permanent Glass Railing Systems, Guards & Balustrades.
- H. American Welding Society (AWS):
  - 1. AWS Specifications for Welding Rods and Bare Electrodes.
- I. Americans with Disabilities Act Standards for Accessible Design (ADASAD).
- J. Copper Development Association (CDA):
  - 1. Standards Handbook, Wrought Copper and Copper Alloy Mill Products, Part 2 Alloy Data.
  - 2. Standards Handbook, Cast Copper and Copper Alloy Products, Part 7 Alloy Data.
  - 3. Copper, Brass and Bronze Design Handbook for Architectural Applications.
- K. General Service Administration (GSA) Federal Specifications (FS):
  - 1. DD-G-1403 Glass, Plate (Float), Sheet, Figured, and Spandrel (Heat
  - Strengthened and Fully Tempered).
  - 2. QQ-C-390 Copper Alloy Castings.
  - 3. QQ-S-766 Stainless Steel, Class 302 or 304.
  - 4. FS-TT-P-641 Primer Coating, Zinc Dust/Zinc Oxide (for Galvanized Surfaces).
  - 5. FS-TT-P-645 Primer, Paint, Zinc Chromate, Alkyd Type.
  - 6. FS-TT-P-645A Primer, Paint, Zinc Chromate, Alkyd Type.
- L. Green Globes System
- M. International Code Council (ICC):
  - 1. International Building Code (IBC).
  - 2. International Residential Code (IRC).
- N. Iron and Steel Society (ISS):
  - 1. Steel Products Manual
    - a. Sheet Steel.
    - b. Stainless and Heat Resisting Steels.
- O. Military Specifications (MIL):
  - 1. MIL-A-46104 Aluminum Alloy Extruded Rod, Bar, and Shapes, 7001.
  - 2. MIL-C-5688 Pre-Stretching and Proof-Testing of Wire Rope Assemblies.
  - 3. MIL-P-1144 Pipe, Corrosion Resistant, Stainless Steel, Seamless or Welded.
  - 4. MIL-P-25995 Pipe, Aluminum Alloy, Drawn or Extruded.
  - 5. MIL-R-36516 Rail, Restraint.
  - 6. MIL-W-87161 Wire Strand, Non-flexible, for Aircraft Control, Oil Free Condition.

- P. National Association of Architectural Metal Manufacturers (NAAMM):
  - 1. NAAMM/NOMMA Metal Finishes Manual.
  - 2. Pipe Railing Manual.
  - 3. Metal Stair Manual.
- Q. National Association of Home Builders (NAHB):
  - 1. NAHB Model Green Home Building Guidelines.
- R. National Association of Home Builders' Research Center (NAHBRC):
  - NAHBRC Review of Fall Safety of Children Between the Ages of 18 Months and 4 Years in Relations to Guards and Climbing in the Built Environment.
- S. National Fire Protection Association (NFPA):
  - 1. NFPA 101 Life Safety Code.
- T. Institute of Building Sciences:
  - 1. Metric Guide for Federal Construction.
- U. U.S. Green Building Council:
  - 1. The Leadership in Energy and Environmental Design (LEED) Green Building Rating System.

#### 1.04 SUBMITTALS

1.

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

# B. Submit shop drawings and product data.

- 1. Show sections and plans of stairs, dimensions and assembly of components.
  - a. Railings.
  - b. Handrail.
  - c. Brackets.
  - d. Reinforcements.
  - e. Anchors.
  - f. Welded and bolted connections.
- 2. Show field connections.
- 3. Provide setting diagrams for installation of anchors, location of pockets, weld plates for attachment of rails to structure, and blocking for attachment of wall rail.
- 4. Indicate required field measurements.
- 5. Indicate component details, materials, finishes, connection and joining methods, and the relationship to adjoining work.
- C. Submit manufacturer's installation instructions.
- D. Samples:
  - 1. Submit duplicate samples of railing showing style and finish. One approved sample will be returned to Contractor.
  - 2. Submit sample(s) of pipe rail and glass.
  - 3. Certificates:
    - a. Furnish manufacturer's certification that materials meet specification requirements.
    - b. Furnish certification and calculations by an engineer registered in the state where the project is located showing that safety requirements are met.

## 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 5-year experience manufacturing similar products.
- B. Installer Qualifications: Minimum 2-year experience installing similar products.
- C. Regulatory Requirements:
  - 1. Components and installation shall be in accordance with state and local code authorities.
  - 2. Components and installation shall comply with current ADASAD or ICC/ANSI A117.1 guidelines.
- D. Certifications:
  - 1. Furnish certification that all components and fittings are furnished by the same manufacturer or approved by the primary component manufacturer.
  - 2. Furnish certification that components were installed in accordance to the manufacturer's engineering data to meet the specified design loads.
- E. 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. Refinish mock-up area as required to produce acceptable work.

#### 1.06 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.
- B. Pre-Installation Meeting:
  - 1. Prior to the beginning of work, conduct a pre-job conference at the job site.
  - 2. Provide seven calendar days' advance written notice ensuring the attendance by competent authorized representatives of the fabricator, building owner's representative, architect and subcontractors whose work interfaces with the Work of this section.
  - 3. Review the specifications to determine any potential problems, changes, scheduling, unique job site conditions, installation requirements and procedures and any other information pertinent to the installation.
  - 4. Record the results of the conference and furnish copies to all participants.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the job site in good condition and properly protected against damage to finished surfaces.
- B. Storage on Site:
  - 1. Store material in a location and in a manner to avoid damage. Stacking shall be done in a way, which will prevent bending.
  - 2. Store material in a clean, dry location away from uncured concrete and masonry. Cover with waterproof paper, tarpaulin, or polyethylene sheeting in a manner that will permit circulation of air inside the covering.
  - 3. Keep handling on site to a minimum. Exercise particular care to avoid damage to finishes of material.

#### 1.08 PROJECT CONDITION

A. 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 recommended limits.

#### 1.09 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
- B. Ensure that field preparation of Work of this section is completed in time to prevent interruption of construction progress.
  - 1. Field measuring for weld plates, sleeves and insert locations.
  - 2. Field measuring.
  - 3. Anchors or inserts for terrazzo or precast concrete.

#### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Acceptable Manufacturer: R & B Wagner, Inc (Wagner Companies) located at: 10600 W. Brown Deer Rd.; Milwaukee, WI 53224; Toll Free Tel: 888-243-6914; Tel: 414-214-0444; Fax: 414-214-0450; Email: request info (RFQ@mailwagner.com); Web: www.wagnerarchitectural.com www.shopwagner.com
  - 1. Schedule 40 1.9 Inch (48.2mm) diameter grade 316 satin stainless steel 'Legato" post kits with mechanical fittings and attachment for field installation
  - 2.  $\frac{1}{2}$ " x 2" Flat Blade Grade 316 Satin Stainless Steel "Legato" post kits with mechanical fittings and attachment for field installation
    - a. Infill:  $\frac{1}{2}$  inch thick tempered laminated safety glass panels
      - i. Color: Clear
      - ii. Exposed glass edges (flat polished)
      - Clamps: Square
  - 3. Shop fabricate such that no jobsite welding, grinding or cutting is required.
  - 4. Finish: Brushed satin stainless steel #4 finish
  - 5. Post height:  $42 \operatorname{inch} 1067 \operatorname{mm}$
  - 6. Post Configurations:
    - a. End Post Surface Mount
    - b. Mid Post Surface Mount
- B. Heavy duty bottom flange with snap on decorative flange cover.
- C. Substitutions: Not permitted.

b.

D. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 – Product Requirements.

#### 2.02 STRUCTURAL REQUIREMENTS

- A. Delete if not required. Railing assembly shall withstand a minimum concentrated load of 200 pounds (91 kg) applied vertically downward or horizontally in any direction, but not simultaneously, at any point at the top of the guard or handrail.
- B. Railing assembly shall withstand a minimum uniform load of 50 pounds per foot (76 kg/meter) applied horizontally or vertically downward, but not simultaneously, on the guard or handrail.

C. Guard intermediate rails, balusters, panel fillers, cable infill, or posts shall be designed for a uniform load of not less than 50 pounds per square foot (248 kg/sq. meter) applied horizontally over the gross area of the guard of which they are part. Reactions due to this loading need not be added to the loading specified for the main supporting members of the guard.

# 2.03 MATERIALS AND FINISHES

- A. Stainless Steel:
  - 1. Type 316.
- B. Glass:
  - 1. Laminated, fully tempered, ASTM C 1172, with PVB interlayer.

# 2.04 ARCHITECTURAL GLASS RAILING SYSTEM

- A. Railing system shall be surface mounted.
- B. Rails: Fabricate rails from stainless steel Schedule 40, 316 stainless steel, 1.5" diameter.
- C. Posts: Fabricate posts from 1.9 inch outside diameter.
- D. Infill:
  - 1. Glass: 1/2 inch (13 mm) tempered laminated glass mounted to posts with panel clips, Wagner No. GR 310R.7

#### 2.05 FASTENERS

- A. Mechanical fasteners used in the assembly of stainless steel or aluminum railings shall be manufactured from stainless steel.
- B. Exposed mechanical fasteners for use with bronze materials shall be manufactured from yellow brass.
- C. Cement: Hydraulic, ASTM C 595, factory prepared with accelerator.

#### 2.06 HANDRAIL BRACKETS

- A. Material: Stainless steel.
- B. Fabrication: Machined.
- C. Glass Mount: GB250, two (2) per glass panel.

## 2.07 FABRICATION

- A. Form rail-to-end post connections and all changes in rail direction by miter elbows.
- B. Form rail-to-end post connections and all changes in rail direction by radius elbows.
- C. Cut material square and remove burrs from all exposed edges, with no chamfer.
- D. Make exposed joints butt tight and flush.
- E. Close exposed ends by use of appropriate end cap.
- F. For posts set in concrete, furnish matching sleeves or inserts not less than 5 inches long.

# HANDRAILS & RAILINGS

- G. Locate intermediate rails midway between top rail and finished floor or center line of tread.
- H. Locate intermediate rails equally spaced between top rail and finished floor or center line of tread.
- I. Verify dimensions on site prior to shop fabrication.
- 2.08 WALL MOUNTED HANDRAIL
  - A. Rails: Schedule 40, 316 stainless steel, 1.5" dia.
  - B. Brackets: MB 3300W, 6'-0" o.c. max. spacing.

# 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. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Supply items to be cast in concrete, embedded in masonry and placed in partitions.

# 3.03 METAL INTERACTION

- A. When aluminum components come into contact with dissimilar metals, surfaces shall be kept from direct contact by painting the dissimilar metal with a heavy coat of a proper primer.
- B. When aluminum components come into contact with dissimilar metals, surfaces shall be kept from direct contact by painting the dissimilar metal with asphalt paint.
- C. When aluminum components come into contact with cement or lime mortar, exposed aluminum surfaces shall be painted with heavy bodied bituminous paint.
- D. When aluminum components come into contact with cement or lime mortar, exposed aluminum surfaces shall be painted with water-white methacrylate lacquer.
- E. When aluminum components come into contact with cement or lime mortar, exposed aluminum surfaces shall be painted with zinc chromate.

#### 3.04 INSTALLATION

- A. Install in accordance with shop drawings and manufacturer's instructions at locations indicated on the drawings.
- B. Erect work square and level, horizontal or parallel to rake of steps or ramp, rigid, and free from distortion or defects detrimental to appearance or performance.

C. Expansion joints shall be provided as needed to allow for thermal expansion or contraction.

# 3.05 CLEANING

- A. As installation is completed, wash thoroughly using clean water and soap; rinse with clean water.
- B. Do not use acid solution, steel wool or other harsh abrasives.
- C. If stain remains after washing, remove finish and restore in accordance with NAAMM/NOMMA Metal Finishes Manual.
- D. Finish shall not be removed from anodized aluminum.

# 3.06 REPAIR OF DEFECTIVE WORK

- A. Remove stained or otherwise defective work and replace with material that meets specification requirements.
- B. Repair damaged finish as directed by Architect.
- C. Replace defective or damaged components as directed by Architect.

#### 3.07 PROTECTION

A. Protect installed products until completion of project.

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# SECTION 06 11 40 WOOD BLOCKING AND CURBING

# PART 1 GENERAL

## 1.1 SECTION INCLUDES

- A. Roof curbs and cants.
- B. Blocking in wall and roof openings.
- C. Wood furring and grounds.
- D. Concealed wood blocking for support of toilet and bath accessories, wall cabinets and wood trim.
- E. Telephone and electrical panel boards.
- F Preservative treatment of wood.

# 1.2 RELATED SECTIONS

- A. Section 03 30 00 Cast-in-Place: Concrete openings to receive woodblocking.
- B. Section 04 20 00 Unit Masonry: Masonryopenings to receive wood blocking.

## 1.3 REFERENCES

- A. ALSC (American Lumber Standards Committee) Softwood Lumber Standards.
- B. APA (American Plywood Association).
- C. AWPA (American Wood Preservers Association) C1 All Timber Products Preservative Treatment by Pressure Process.
- D. AWPA (American Wood Preservers Association) C20 Structural Lumber Fire Retardant Treatment by Pressure Process.
- E. NFPA (National Forest Products Association).
- F. RIS (Redwood Inspection Service).
- G. SPIB (Southern Pine Inspection Bureau).
- H. WCLIB (West Coast Lumber Inspection Bureau).
- I. WWPA (Western Wood Products Association).

# 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following agencies:
  - 1. Lumber Grading Agency: Certified by ALSC.
  - 2. Plywood Grading Agency: Certified by APA.

#### WOOD BLOCKING AND CURBING

# 1.5 SUBMITTALS

A. Product Data: In accordance with Section 01 33 00, submit manufacturer's certification for pressure-treated and fire-treated lumber.

# PART 2 PRODUCTS

## 2.1 MATERIALS

- A. Lumber Grading Rules: WCLIB and WWPA.
- B. Miscellaneous Framing: Stress Group D, S.P.F. species, 19 percent maximum moisture content, pressure preservative treat when wood is in contact with concrete, masonry or metal.
- C. Plywood: APA Grade C-C-X; unsanded.
  - 1. Fire Retardant Treated: Locations as indicated in Drawings or as listed below.
  - 2. Tongue and Groove: As indicated in Drawings.
- D. Particle board: Will not be acceptable.

# 2.2 ACCESSORIES

- A. Fasteners and Anchors:
  - 1. Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
  - 2. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

# 2.3 INTERIOR FACTORY WOOD TREATMENT

- A. Wood Preservative (Pressure Treatment) EPA Approved: AWPA Treatment C1 using water borne preservative with 0.060 L.I.S. CF retainage.
  - 1. Products treated with "CCA" (chromated copper arsenate) will not be permitted.
  - 2. "ACQ" (amine copper qust) or "CBA" (copper baron azole) treated products will be acceptable.
- B. Fire Treatment: Shall be equal to Hoover Treated Wood Products, Inc. of Milford, VA (804) 633-5021 Pyro-Guard Complying with AWPA Type A fire retardant treatment and shall have a flame spread rating of 25 or less when tested in accordance with ASTM E-84.
  - 1. Interior Fire-retardant treated lumber and plywood shall have an equilibrium moisture content of not over 19% for lumber and 15% for plywood when tested in accordance with ASTM D-3201 at 92% relative humidity.
  - 2. Each piece of fire-retardant treated lumber and plywood shall be manufactured under Underwriters Laboratories and shall bear the UL Qualification label for surface burning characteristics in the 30-minute E-84 flame test and also indicate kiln drying after treatment (KDAT).
  - 3. Other Acceptable Manufacturers:
    - a. Dricon Fire Retardant Treated Wood.

#### PART 3 EXECUTION

## 3.1 INSTALLATION

- A. Fire retardant treated wood used in structural applications shall be installed in accordance with the conditions and limitations listed in ESR-1791 as issued by the ICC Evaluation Service Inc.
- B. Fire retardant treated wood shall be installed in compliance with the requirements of the applicable building codes and product recommendations.
- C. Fire retardant treated wood shall not be installed in areas where in service it is exposed to precipitation, direct weeing, or condensation.
- D. As with untreated wood, avoid exposure to precipitation during shipping, storage or installation. Apply a water resistive barrier or underlayment over dry sheathing as soon as practical to avoid precipitation on the panel. Panels that get wet should be allowed to dry before covering or be replaced.

#### 3.2 SCHEDULE

- A. Concealed blocking in walls.
- B. Telephone and Electric Backboards (to remain unpainted).

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## SECTION 06 16 43 GYPSUM SHEATHING

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes: Fiberglass-mat faced, exterior gypsum sheathing.
- B. Related Sections:
  - 1. Section 05 40 00 Cold Formed Metal Framing.
  - 2. Section 09 26 00 Gypsum Board Systems.

#### 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
  - 2. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  - 3. ASTM C1002 Standard Specification of Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
  - 4. ASTM C1177 Standard Specification for Glass Mat Gypsum Sheathing for use as Sheathing.
  - 5. ASTM C1280 Standard Specification for Application of Gypsum Sheathing.
  - 6. ASTM D3273 Standard Test Method of Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
  - 7. ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers.
  - 8. ASTM E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
  - 9. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
  - 10. ASTM C1396 Standard Specification for Gypsum Board.
  - 11. ASTM E136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C.
  - 12. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. Gypsum Association (GA): GA-253 Application of Gypsum Sheathing.

#### 1.3 SUBMITTALS

A. Product Data: Manufacturer's specifications and installation instructions for each product specified..

# 1.4 WARRANTY

- A. Provide products that offer twelve months of coverage against in-place exposure damage (delamination, deterioration and decay) commencing with the date of installation of the product in such structure.
- B. Manufacturer's Warranty:
  - 1. Five years against manufacturing defects from the date of purchase of the product for installation.

## PART 2 - PRODUCTS

# 2.1 MAUFACUTURERS

- A. Georgia-Pacific Gypsum LLC.
- B. American Gypsum.
- C. USG
- D. Certainteed.

#### 2.2 MATERIALS

- A. Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177.
  - 1. Thickness:  $\frac{1}{2}$  inch.
  - 2. Width: 4 feet.
  - 3. Length: 10 feet.
  - 4. Weight: 1.9 lbs./sq. ft.
  - 5. Edges: Square.
  - 6. Surfacing: Fiberglass mat on face, back, and long edges.
  - 7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 lbs. per sq. ft., dry.
  - 8. Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
  - 9. Humidified Deflection (ASTM C1177): Not more than 2/8 inch.
  - 10. Permeance (ASTM E96): Not less than 23 perms.
  - 11. R-Value (ASTM C518): 0.56.
  - 12. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
  - 13. Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3week protocol): Will not support microbial growth.
- B. Fire-Rated Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177, Type X:
  - 1. Thickness: 5/8 inch.
  - 2. Width: 4 feet.
  - 3. Length: 10 feet.
  - 4. Weight: 2.5 lbs./sq. ft.
  - 5. Edges: Square.
  - 6. Surfacing: Fiberglass mat on face, back, and long edges.
  - 7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 654 lbs. per sq. ft., dry.
  - 8. Flexural Strength, Parallel (ASTM C11773): 100 lbf, parallel.
  - 9. Humidified Deflection (ASTM C1177): Not more than 1/8 inch.
  - 10. Permeance (ASTM E96): Not less than 17 perms.
  - 11. R-Value (ASTM C518): 0.67.
  - 12. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
  - 13. Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3week protocol): Will not support microbial growth.

#### 2.3 ACCESSORIES

A. Screws: ASTM C1002, corrosion resistant treated.

## PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Verification of Conditions:
  - 1. Inspection: Verify that project conditions and substrates are acceptable, to the installer, to begin installation of work of this section.

#### 3.2 **PROTECTION**

- A. General: In accordance with GA-253, ASTM C1280, and the manufacturer's recommendations.
  - 1. Manufacturer's Recommendations:
    - a. Current "Product Catalog", Georgia-Pacific Gypsum.
    - b. The Gypsum Construction Handbook, latest edition.

#### 3.3 **PROTECTION**

A. Protect gypsum board installations from damage and deterioration until date of Substantial Completion.
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#### SECTION 06 20 00 FINISH CARPENTRY

#### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Finish carpentry items, including finish trim.
- B. Hardware and attachment accessories.
- 1.2 RELATED SECTIONS
  - A. Section 06 11 40 Wood Blocking and Curbing: Grounds and support framing.
  - B. Section 06 42 19 Manufactured Plastic-Laminate Clad Casework.
  - C. Section 08 21 00 Flush Wood Doors.
  - D. Section 08 80 00 Glazing: Glass and glazing of wood partitions screens.
  - E. Section 09 90 00 Painting: Painting and finishing of finish carpentry items.

#### 1.3 REFERENCES

- A. ASTM E84 Test Method for Surface Burning Characteristics of Building Materials.
- B. AWI Quality Standards.
- C. AWPA (American Wood Preservers Association) C2 Lumber, Timbers, Bridge Ties and Mine Ties Preservative Treatment by Pressure Processes.
- D. AWPA (American Wood Preservers Association) C20 Structural Lumber Fire Retardant Treatment by Pressure Process.
- E. BHMA A156.9 Cabinet Hardware.
- F. FS MMM-A-130 Adhesive, Contact.
- G. HPMA (Hardwood Plywood Manufacturer's Association) HP American Standard for Hardwood and Decorative Plywood.
- H. NEMA (National Electric Manufacturers Association) LD3 High Pressure Decorative Laminates.
- I. NHLA (National Hardwood Lumber Association).
- J. NWWDA (National Wood Window and Door Association) I.S.4 Water Repellent Preservative Treatment for Millwork.
- K. PS 1 Construction and Industrial Plywood.
- L. PS 20 American Softwood Lumber Standard.

#### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories, to a minimum scale of 1-1/2 inch to 1 ft.
- C. Provide instructions for attachment hardware.
- D. Samples: Submit two samples of 12 inch in size illustrating wood grain and specified finish.
- E. Submit two samples of wood trim six (6) inches long.

# 1.5 QUALITY ASSURANCE

A. Perform work in accordance with AWI Premium Custom Economy quality. NHLA.

# 1.6 QUALIFICATIONS

- A. Fabricator: Company specializing in fabricating the products specified in this section with minimum five (5) years documented experience.
- 17 DELIVERY, STORAGE, AND HANDLING
  - A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.
  - B. Protect work from moisture damage.
- 1.8 FIELD MEASUREMENTS
  - A. Verify that field measurements are as indicated on shop drawings.
- 1.9 COORDINATION
  - A. Coordinate work under provisions of Section 01 31 00.

# PART 2 PRODUCTS

#### 2.1 LUMBER MATERIALS

- A Softwood Lumber: PS 20; Graded in accordance with AWI Custom; white pine species, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.
- B. Hardwood Lumber: Graded in accordance with AWI Custom Premium; Sapele Mahogany species, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

# 2.2 SHEET MATERIALS

- A. Softwood Plywood: PS 1 Grade C-D; Graded in accordance with AWI Custom; veneer lumber core; White Pine species, cut.
- B. Wood Particleboard: Will not be permitted.

#### 2.3 FASTENERS

- A. Fasteners: Of size and type to suit application; galvanized finish in concealed locations and stainless-steel finish in exposed locations.
- B. Concealed Joint Fasteners: Threaded steel.

# 2.4 ACCESSORIES

- A. Lumber for Shimming: Softwood lumber of cedar species.
- B. Primer: Alkyd primer sealer type.
- C. Wood Filler: Solvent Oil base, tinted to match surface finish color.

#### 2.5 FABRICATION

- A. Fabricate to AWI Custom standards.
- B. Shop assemble work for delivery to site, permitting passage through building openings.
- C. Fit exposed sheet material edges with 3/8 inch (9.5 mm) matching hardwood veneer or plastic laminate edging matching adjacent surface. Use one piece for full length only.
- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

# PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

# 3.2 INSTALLATION

- A. Install work in accordance with AWI Custom Quality Standard.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Install components and trim with nails, screws, or bolts with blind fasteners at 16 inches on center.
- E. Install hardware in accordance with manufacturer's instructions.

# 3.3 ERECTION TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

# END OF SECTION

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# SECTION 06 42 19 MANUFACTURED PLASTIC-LAMINATE CLAD CASEWORK

#### PART 1 GENERAL

# 1.1 SECTION INCLUDES

A. All manufactured casework other than units specified in Section 06 41 00.

# 1.2 RELATED SECTIONS

- A. Section 09 90 00 Painting: Field painting of exposed metal frame.
- B. Section 11 42 00 Commercial Kitchen Equipment.
- C. Division 22- Mechanical Plumbing Piping: Domestic water supply to equipment.
- D. Division 22 Mechanical Plumbing Fixtures: Sinks for equipment.
- E. Division 26 Electrical Equipment Wiring Systems: Conduit and electrical power to equipment.

# 1.3 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate equipment locations, large scale plans, elevations, cross sections, rough-in and anchor placement dimensions and tolerances, and clearances required.
- C. Product Data: Provide equipment dimensions and construction, equipment capacities, physical dimensions, utility and service requirements and locations, and point loads.
- D. Samples: Submit two samples of exposed finish surfaces, 12 x 12 inch in size illustrating color and finish.
- E. Manufacturer's Installation Instructions: Indicate special installation requirements.
- F. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

#### 1.4 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01 77 00.
- B. Record actual locations of concealed utility connections.

#### 1.5 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 01 78 20.
- B. Operation Data: Include description of equipment operation, adjusting and testing required.
- C. Maintenance Data: Identify system maintenance requirements, servicing cycles, lubrication types required and local spare part sources.

# 1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years documented experience.

# 17 REGULATORY REQUIREMENTS

- A. Conform to applicable code for equipment.
- B. Conform to UL requirements for fabrication and installation of equipment.
- C. Provide certificate of compliance from authority having jurisdiction indicating approval of installation.

# 1.8 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this section, under provisions of Section 01 31 00.

# 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.
- B. Leave building openings of sufficient size to permit transport of unit to final position.

# 1.10 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

#### 1.11 COORDINATION

- A. Coordinate work under provisions of Section 01 31 00.
- B. Coordinate equipment installation with size, location and installation of service utilities.

# 1.12 WARRANTY

A. Provide three-year warranty under provisions of Section 01 77 00. Note: Minimum three-year manufacturer's standard warranty.

# PART 2 PRODUCTS

#### 2.1 MANUFACTURER

- A. Specified or Scheduled Manufacturers:
  - 1. Stevens Laminate Casework 3mm PVC full overlay (formerly 2500 Series); Teutopolis, IL 1-217-857-6411
- B. Other Acceptable Manufacturers:
  - 1. TMI Systems Design Corp., 7000 series with radiused corners.
  - 2. LSI Corporation of America, Inc.
  - 3. Cabinets by Design, Inc.
- C. Substitutions: Under provisions of the General Conditions to the Construction Contract.

#### 2.2 MATERIALS (LAMINATE CASEWORK)

#### A. Core Material.

- 1. Cabinet components shall be industrial grade particleboard core material meeting ANSI A208.11993 standards as tested in accordance with ASTMD 1037-91A standards.
- 2. Medium density fiberboard (MDF) shall be used in all drawer components and shall be tested in accordance with ANSI A208.2 1994 standards.
- 3. Industrial hardboard shall be pre-finished 1/4" thickness composed of wood fibers, phenolic resin binders and moisture inhibitors that meet or exceed the hardboard product standard ANSI/AHA A135.4 1988.
- B. Surface Materials.
  - 1. Exposed exteriors shall be high pressure decorative plastic laminate, thermoset to core using catalyzed PVA glue with a minimum average pressure of 90 PSI and average 180-degree F. temperature. High pressure decorative plastic laminate shall meet NEMA LD 3-1995, VGS.028 specification standards.
  - 2. Exposed doors and drawer fronts shall be high pressure decorative plastic laminate, thermoset to core using catalyzed PVA glue with a minimum average pressure of 90 PSI and average 180-degree F. temperature. High pressure decorative plastic laminate shall meet NEMA LD 3-1995, VGS.028 specification standards.
  - Exposed interiors shall be permanently thermofused melamine laminate, fused to core using a minimum average pressure of 320 PSI and average 320-degree F. temperature. Thermofused melamine laminate shall be tested against the high-pressure laminate NEMA LD 3-1995, VGS.028 specification standards. (Warranted for life against delamination.)
  - 4. Semi-exposed and concealed surfaces shall be permanently thermofused melamine laminate or high-pressure decorative plastic laminate cabinet liner, 0.020" thickness for balanced construction. Thermofused melamine laminate shall be tested against the high-pressure laminate NEMA LD 3-1995, VGS.028 specification standards.
  - 5. Exposed backs shall be permanently thermofused melamine laminate, fused to core using a minimum average pressure of 320 PSI and average 320-degree F. temperature. Thermofused melamine laminate shall be tested against the high-pressure laminate NEMA LD 3-1995, VGS.028 specification standards. (Warranted for life against delamination.)
- C. Edgings.
  - 1. Exposed exterior cabinet front edges shall be banded with a contrasting or matching Flat Edge rigid PVC extrusion, resistant to chip, crack and high impact for additional durability. Edging shall have a satin finish. Edge banding shall be applied with hot melt adhesive.
  - 2. Door and drawer front edges shall be edged with a contrasting or matching rigid PVC extrusion, 3MM (1/8") in thickness, resistant to chip, crack and high impact for additional durability. Edging shall have a satin finish. The 3MM thick edging shall be applied with hot melt adhesive and shaped to provide radiused edges and radiused corners.
  - 3. Adjustable shelves shall be banded with PVC extrusion, resistant to chip, crack and high impact for additional durability. Edging shall have a satin finish. Edging shall be applied with hot melt adhesive. Flat Edge PVC edging shall be applied to four (4) edges of adjustable shelf.
  - 4. All other interior components, including drawers, shall be banded with a Flat Edge PVC extrusion, resistant to chip, crack and high impact for additional durability. Edging shall have a satin finish. Edging to be machine applied with hot melt adhesive.

#### D. Hardware.

- 1. Hinges shall be fully concealed from view when door is closed and shall permit 165-degree door swing. Hinge crank shall be heavy steel with a concealed, integral self-closing spring mechanism. Hinge boss shall be heavy stamp steel. Nylon inserts shall be provided in the door for positive screw attachment. Hinge attachment to sides of cabinet shall employ special 5MM threaded fasteners for additional strength. Hinges shall have three-dimensional adjustment capability. Hinge shall have a lifetime guarantee warranted by the hinge manufacturer. Doors less than 48" in height shall have two (2) hinges each door; doors 48"-63" in height shall have three (3) hinges each door; all doors greater than 63" in height shall have four (4) hinges each door.
- 2. Door catches shall be heavy duty, spring loaded, large diameter (17.5MM-11/16") roller type catch mounted at bottom edge. All doors over 48" in height shall be provided with roller catch at both top and bottom of door.
- 3. Catch strike plates shall be injection molded ABS, with an integral molded engagement ridge. Strike plate shall also provide a wide face bumper ensuring a positive door stop.
- 4. Pulls shall be Solid metal bent wire, 4" length, in chrome finish.
- 5. Drawers and slide out shelves shall be suspended with bottom mount, side and bottom attached nylon roller epoxy coated steel slides to ensure quiet, smooth operation. Lateral stability is achieved through a special formed captive profile. Slides shall have 100 lb. load rating, with both in and out drawer stop, 3" self-close feature and a side adjustment cam allowing 3MM side to side alignment.
- 6. Drawers specifically noted for full extension file use shall be suspended with bottom mount, side and bottom attached, nylon roller epoxy coated steel slides to ensure quiet, smooth operation. Lateral stability is achieved through a special formed captive profile. Slides shall have 150 lb. load rating, with both in and out drawer stop, and 3" self-close feature. File drawer shall include extruded top mounted molded side rails to accept standard hanging file folders.
- 7. Kneespace, pencil drawers and keyboard trays shall be designed to permit under counter or support frame mounting, with 100 lb. nylon roller epoxy coated steel slides.
- 8. Hanger bars shall be heavy chrome plated tubing. Bars shall be securely affixed to cabinet shelves.
- 9. Tote trays shall be of high impact polystyrene with smooth edges. Each tray to include an identification card holder and shall be suspended from rails securely attached to cabinet verticals.
- 10. Shelf support clips shall be injection molded clear polycarbonate. Support clips shall incorporate integral molded lock tabs to retain shelf from tipping or inadvertently being lifted out. Support clip shall have 5MM diameter double pin engagement into precision bored hole pattern in cabinet vertical members. Clips shall have a molded ridge which provides pressure against edge of shelving to maintain positive pin engagement. Clip shall be designed in such a manner to provide means for permanent attachment to shelf. Static test load must exceed 200 lb. per clip.
- 11. Dividers that are 1/4" thick shall be fully adjustable and retained with injection molded clear polycarbonate clip.
- 12. Locks shall be cylinder type, die cast, with five (5) disc tumbler mechanism. Each lock shall be provided with milled brass key. Master-keying shall be available. Cabinets with multiple locks installed shall be keyed alike by room, with each cabinet keyed differently unless otherwise specified. Locks shall be Remove-A-Core to give flexibility for different pass key options. Locks shall be provided where indicated on drawings.

#### E. Work Surfaces.

- 1. Plastic laminate countertops shall be surfaced with general purpose .050" thick plastic laminate meeting NEMA spec. LD3-1985. Countertop cores shall be 1-1/8" full thickness 45 lb. density industrial grade particle board. Exposed edges shall be covered with same laminate as top surface. Tops shall include backing sheet on underside.
- 2. Backsplashes and side or end splashes shall be provided as indicated on drawings and shall be surfaced with same laminate as top.
- F. Color Selections.
  - 1. Exposed cabinet exteriors shall be chosen from high pressure decorative plastic laminate selections as described in casework manufacturer's color selector guide.
  - 2. Exposed doors and drawer fronts shall be chosen from high pressure decorative plastic laminate selections as described in casework manufacturer's color selector guide.
  - 3. Semi-exposed and concealed surfaces, including drawer box components, shall be finished in either pearl or grey, as selected from casework manufacturer's standard interior color selections.
  - 4. Exposed interior components, including both faces of shelves and interior face of backs to be as selected from casework manufacturer.
  - 5. Door and drawer front edges shall be chosen from 3MM thick PVC in contrasting or matching colors as described in manufacturer's color guide.
  - 6. Exposed front edges of cabinets, including exposed interior edges in Flat Edge PVC in contrasting or matching colors as described in manufacturer's color guide, or commercial match to selected exposed exterior color, based on availability.
  - 7. Semi-exposed edges of cabinet components, including drawers, shall be standard interior color selections.
  - 8. Solid metal bent wire pulls shall be available in chrome or brass finish; and injection molded pulls in either bent wire or contour design to be available in twenty (20) colors as selected from manufacturer's color selector.
  - 9. Casework of substitute brands with lesser amounts or more restrictive selection requirements will not be considered equal and shall be rejected.
  - 10. Finishes to be laminate manufacturer's matte, suede or equivalent finish as approved by architect. Samples will be reviewed by architect for color, texture and pattern only.

# PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify equipment rough in under provisions of Section 01-31-00.
- B. Verify that rough-in frames, anchors and supports are accurately placed.

#### 3.2 PREPARATION

A. Provide rough-in frame and anchors for placement.

# 3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with standards required by authority having jurisdiction.

#### MANUFACTURED PLASTIC-LAMINATE CLAD CASEWORK

- C. Anchor equipment securely in place.
- D. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- E. Touch-up minor damaged surfaces caused during installation. Replace damaged components as directed by Architect/Engineer.
- 3.4 MANUFACTURER'S FIELD SERVICES
  - A. Prepare and start equipment under provisions of Section 01 40 00.

#### 3.5 ADJUSTING

- A. Adjust work under provisions of Section 01 73 00.
- B. Adjust operating equipment to efficient operation.

#### 3.6 DEMONSTRATION

- A. Provide systems demonstration under provisions of Section 01 79 00.
- B. Demonstrate equipment operation and maintenance.

# END OF SECTION

#### SECTION 07 21 00 THERMAL INSULATION

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Perimeter insulation under slabs-on-grade.
  - 2. Perimeter wall insulation (supporting backfill).
  - 3. Cavity-wall insulation.
  - 4. Concealed building insulation.
  - 5. Radiant barriers.
  - 6. Vapor retarders.
  - 7. Sound attenuation insulation.
- B. Related Sections include the following:
  - 1. Section 04 20 00 Unit Masonry for insulation installed in cavity walls and masonry cells.
  - 2. Section 07 21 20 Board Insulation.
  - 3. Section 07 54 19 Polyvinyl-Chloride PVC-TPA Roofing for insulation specified as part of roofing construction.
  - 4. Section 09 26 00 Gypsum Board for installation in metal-framed assemblies of insulation specified by referencing this Section.
  - 5. Section 22 07 00 Plumbing Insulation.
  - 6. Section 23 07 00 HVAC Insulation.

#### 1.2 DEFINITIONS

A. Mineral-Fiber Insulation: Insulation composed of glass fibers; produced in boards and blanket with latter formed into batts (flat-cut lengths) or rolls.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Plenum Rating: Provide glass-fiber insulation where indicated in ceiling plenums whose test performance is rated as follows for use in plenums as determined by testing identical products per "Erosion Test" and "Mold Growth and Humidity Test" described in UL 181, or on comparable tests from another standard acceptable to authorities having jurisdiction.
  - 1. Erosion Test Results: Insulation shows no visible evidence of cracking, flaking, peeling, or delamination of interior surface of duct assembly, after testing for 4 hours at 2500-fpm air velocity.
  - 2. Mold Growth and Humidity Test Results: Insulation shows no evidence of mold growth, delamination, or other deterioration due to the effects of high humidity, after inoculation with Chaetomium globosium on all surfaces and storing for 60 days at 100 percent relative humidity in the dark.

# 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: Full-size units for each type of exposed insulation indicated.
- C. Product Test Reports (Information Only): Based on evaluation of comprehensive tests performed by a qualified testing agency for insulation products.
- D. Research/Evaluation Reports (Information only): For foam-plastic insulation.

#### 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.
- Β. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-testresponse characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - Surface-Burning Characteristics: ASTM E 84. 1.
  - Fire-Resistance Ratings: ASTM E 119. 2.
  - Combustion Characteristics: ASTM E 136. 3.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
  - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
  - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

# PART 2 - PRODUCTS

#### 2.1 **MANUFACTURERS**

- In other Part 2 articles where titles below introduce lists, the following requirements apply to A. product selection:
  - Available Products: Subject to compliance with requirements, products that may be 1. incorporated into the Work include, but are not limited to, products specified.
  - Available Manufacturers: Subject to compliance with requirements, manufacturers 2. offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

#### 2.2 FOAM-PLASTIC BOARD INSULATION

- Extruded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with A. maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:
  - 1. Available Manufacturers:
    - DiversiFoam Products. a.
    - Dow Chemical Company. b.
    - Owens Corning. с.
    - Pactiv Building Products Division. d.
  - 2. Type V, 3.00 lb./cu. ft.
- Foil-Faced, Polyisocyanurate Board Insulation: ASTM C 1289, Type I, Class 1 or 2, with B. maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, based on tests performed on unfaced core on thicknesses up to 4 inches. 1.
  - Available Manufacturers:
    - Atlas Roofing Corporation. a.

- b. Dow Chemical Company.
- c. Rmax, Inc.

# 2.3 GLASS-FIBER BOARD INSULATION

- A. Manufacturers:
  - 1. CertainTeed Corporation.
  - 2. Johns Manville.
  - 3. Knauf Fiber Glass.
  - 4. Owens Corning.
- B. Unfaced, Flexible Glass-Fiber Board Insulation: ASTM C 612, Type IA; ASTM C 553, Types I, II, and III; or ASTM C 665, Type I; with maximum flame-spread and smoke- developed indexes of 25 and 50, respectively, passing ASTM E 136 for combustion characteristics; and of the following nominal density and thermal resistivity:
  - 1. Nominal density of 1.0 lb./cu. ft., thermal resistivity of 3.7 deg F x h x sq. ft./Btu x in. at 75 deg F.
  - 2. Nominal density of not less than 1.5 lb./cu. ft. nor more than 1.7 lb./cu. ft., thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F.

#### 2.4 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers:
  - 1. CertainTeed Corporation.
  - 2. Guardian Fiberglass, Inc.
  - 3. Johns Manville.
  - 4. Knauf Fiber Glass.
  - 5. Owens Corning.
- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- C. Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (blankets with reflective membrane facing), Class A (membrane-faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil-scrim, vapor-retarder membrane on 1 face.
- D. Where glass-fiber blanket insulation is indicated by the following thicknesses, provide blankets in batt or roll form with thermal resistances indicated:
  - 1. 3-5/8 inches thick with a thermal resistance of 11 deg F x h x sq. ft./Btu at 75 deg F.
  - 2. 5-1/2 inches thick with a thermal resistance of 19 deg F x h x sq. ft./Btu at 75 deg F.
  - 3. 6-1/2 inches thick with a thermal resistance of 21 deg F x h x sq. ft./Btu at 75 deg F.

#### 2.5 VAPOR RETARDERS

- A. Polyethylene Vapor Retarders: ASTM D 4397, 6 mils thick, with maximum permeance rating of 0.13 perm.
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.
- D. Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.

E. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and with demonstrated capability to bond vapor retarders securely to substrates indicated.

#### 2.6 AUXILIARY INSULATING MATERIALS

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.
- B. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
- C. Asphalt Coating for Cellular-Glass Block Insulation: Cutback asphalt or asphalt emulsion of type recommended by manufacturer of cellular-glass block insulation.
- D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

#### 2.7 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:
  - 1. Products:
    - a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
    - b. Eckel Industries of Canada; Stic-Klip Type N Fasteners.
    - c. Gemco; Spindle Type.
  - 2. Plate: Perforated galvanized carbon-steel sheet, 0.030-inch-thick by 2 inches square.
  - 3. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation indicated.
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:
  - 1. Products:
    - a. Gemco; 90-Degree Insulation Hangers.
  - 2. Angle: Formed from 0.030-inch- thick, perforated, galvanized carbon-steel sheet with each leg 2 inches square.
  - 3. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation indicated.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
  - 1. Products:
    - a. AGM Industries, Inc.; RC150.
    - b. AGM Industries, Inc.; SC150.
    - c. Gemco; Dome-Cap.
    - d. Gemco; R-150.
    - e. Gemco; S-150.
  - 2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
    - a. Ceiling plenums.
    - b. Attic spaces.
    - c. Where indicated.
- D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

- 1. Products:
  - a. AGM Industries, Inc.; TACTOO Adhesive.
  - b. Eckel Industries of Canada; Stic-Klip Type S Adhesive.
  - c. Gemco; Tuff Bond Hanger Adhesive.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

# 3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

#### 3.4 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

- A. On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.
  - 1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
- C. Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection course with joints butted. Set in adhesive according to insulation manufacturer's written instructions.
- D. Protect top surface of horizontal insulation from damage during concrete work by applying protection course with joints butted.

#### 3.5 INSTALLATION OF CAVITY-WALL INSULATION

- A. On units of foam-plastic board insulation, install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face, and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates indicated.
  - 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Division 04 Section "Unit Masonry."

#### 3.6 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Set vapor-retarder-faced units with vapor retarder in location indicated of construction, unless otherwise indicated.
  - 1. Tape joints and ruptures in vapor retarder and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- D. Install mineral-fiber insulation in cavities formed by framing members according to the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures.
  - 4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
  - 5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- E. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
  - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
  - 2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
  - 3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
  - 4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- F. Install board insulation in curtain-wall construction where indicated on Drawings according to curtain-wall manufacturer's written instructions.
  - 1. Retain insulation in place by metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated between insulation and glass.

2. Install insulation where it contacts perimeter fire-containment system to prevent insulation from bowing under pressure from perimeter fire-containment system.

# 3.7 INSTALLATION OF VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.
- C. Before installing vapor retarder, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
- D. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.
- E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- F. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

#### 3.8 **PROTECTION**

A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

# 3.9 INSULATION SCHEDULE

- A. 2" thick extruded polystyrene perimeter insulation. Extend 2' min. around perimeter complete coverage under heated floor.
- B. 2" thick polyisocyanurate cavity wall insulation.
- C. 3 5/8" R-13 Fiberglass batt sound attenuation unfaced in exterior walls.
- D. 6" R-21 Fiberglass batt sound attenuation unfaced
- E. 6" R-21 Foil faced fiberglass insulation.

# END OF SECTION

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# SECTION 07 21 20 BOARD INSULATION

#### PART 1 GENERAL

- 1.1 SECTION INCLUDES
  - A. Adhesive bed.
  - B. Board insulation at exterior perimeter foundation wall.
- 1.2 RELATED SECTIONS
  - A. Section 03 30 00 Cast-In-Place Concrete
  - B. Section 04 20 00 Unit Masonry System
  - C. Section 07 21 00 Thermal Insulation

#### 1.3 REFERENCES

- A. ANSI/ASTM D2842 Water Absorption of Rigid Cellular Plastics.
- B. ASTM C240 Testing Cellular Glass Insulating Block.
- C. ASTM C578 Preformed Cellular Polystyrene Thermal Insulation.
- D. ASTM E96 Test Methods for Water Vapor Transmission of Materials.
- E. FS HH-I-530 Insulation Board, Thermal, Un-faced, Polyurethane or Polyisocyanurate.
- F. FS HH-I-551 Insulation Block and Boards, Thermal (Cellular Glass).
- G. FS HH-I-1972/GEN Insulation Board, Thermal, Faced, Polyurethane or Polyisocyanurate.
- 1.4 PERFORMANCE REQUIREMENTS
  - A. Materials of this Section shall provide continuity of thermal barrier at building enclosure elements.

#### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Provide data on product characteristics, performance criteria and limitations.
- C. Manufacturer's Installation Instructions: Indicate special environmental conditions required for installation, installation techniques and details.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- 1.6 ENVIRONMENTAL REQUIREMENTS
  - A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

#### 1.7 COORDINATION

A. Coordinate work under provisions of Section 01 31 00.

#### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS - INSULATION MATERIALS (POLYSTYRENE)

- A. Dow
- B. Amoco Foam Products Co.
- C. Foamular

#### 2.2 INSULATION MATERIALS

A. Foundation, cavity wall, and metal stud window headers:

1.	Polystyrene Insulation: Ext	ruded type, conforming to the following:
	Thermal Resistance	R of 5.0 per inch @ 75F
	Thickness	Thickness indicated
	Board Size	48 x 96 inch
	Compressive Strength	Minimum 30 psi
	Water Absorption	In accordance with ANSI/ASTMC272
	-	1 percent by volume maximum
	Edges	Square edges.
	-	· ·

B. Underslab Insulation. Refer to drawings.

# 2.3 ADHESIVES

A. Adhesive: Type recommended by insulation manufacturer for application.

#### 2.4 ACCESSORIES

A. Tape: Polyethylene self-adhering type, mesh reinforced, 2-inch-wide, waterproof adhesive.

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01 41 00.
- B. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.
- C. Verify substrate surface is flat, free of honeycomb and irregularities, materials or substances that may impede adhesive bond.
- 3.2 INSTALLATION FOUNDATION PERIMETER (POLYSTYRENE)
  - A. Adhere boards to foundation wall perimeter, horizontally. Place boards in a method to maximize contact bedding. Stagger side end joints. Butt edges and ends tight to adjacent board and to protrusions.

- B. Extend boards over control joints, un-bonded to foundation 6 inches on one side of joint.
- C. Immediately following application of board insulation, adhere protective boards over exposed insulation surfaces. Install boards vertically from base of foundation to top of insulation. Butt board joints tight, stagger from insulation.
- 3.3 PROTECTION OF FINISHED WORK
  - A. Protect finished Work under provisions of Section 01 50 00.
  - B. Do not permit Work to be damaged prior to covering insulation.

#### 3.4 SCHEDULE

- A. Perimeter foundation wall insulation.
- B. Cavity wall insulation.
- C. Underslab insulation.
- D. Other areas as shown on the drawings.

# END OF SECTION

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#### SECTION 07 26 10 BELOW GRADE VAPOR RETARDERS

#### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Application of an underslab vapor retarder.

#### 1.2 RELATED SECTIONS

- A. Section 03 30 00 Cast-in-Place Concrete.
- B. Section 07 27 26 Fluid Applied Membrane Air Barriers.
- C. Section 09 30 00 Tiling.

#### 1.3 REFERENCES

- A. ASTM D1709 09 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
- B. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
- C. ASTM E154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs.
- D. ASTM E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- E. ASTM E1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
- F. ASTM F1249-01 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

#### 1.4 SUBMITTALS

- A. Comply with Section 01 33 00 Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.

#### 1.5 QUALITY ASSURANCE

- A. Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the application of the vapor retarder.
- B. Obtain vapor retarder materials from a single manufacturer regularly engaged in manufacturing the product.
- C. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).
- 1.6 PRECONSTRUCTION MEETING

#### **BELOW-GRADE VAPOR RETARDERS**

A. Pre-Construction Meeting: Convene one week prior to installation of underslab vapour retarder. Attendees to be as follows: - Architect, Engineer, General Contractor, Vapor Retarder Installer, and Vapor Retarder Manufacturer to discuss the application in detail.

# 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean, dry area in accordance with manufacturer's instructions.
- C. Protect materials during handling and application to prevent damage or contamination.
- D. Ensure membrane is stamped with manufacturer's name, product name, and membrane thickness at intervals of no more than 85" (220 cm).

# 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Product not intended for uses subject to abuse or permanent exposure to the elements.
- B. Do not apply on frozen ground.

# PART 2 PRODUCTS

# 2.1 ACCEPTABLE MANUFACTURERS

- A. W. R. Meadows, Inc. (Basis of Design
- B. W.R. Grace.
- C. SIKA
- D. Substitutions in accordance with the General Conditions to the Construction Contract.

# 2.2 MATERIALS

- A. Plastic Vapor Retarder (Type A) (Under Concrete Slab)
  - Performance-Based Specification: Vapor retarder membrane shall be manufactured from virgin polyolefin resins and shall meet or exceed all requirements of ASTM E1745, Class A.
    - a. Maximum Water Vapor Permeance (ASTM E154 Sections 7, 8, 11, 12,
      - 13, by ASTM E96, Method B or ASTM F1249)
        - 1) As received: 0.0183 perms.
        - 2) After Wetting and Drying: 0.0219 perms.
        - 3) Resistance to Plastic Flow and Temperature: 0.0197 perms.
        - 4) Effect Low Temperature and Flexibility: 0.0212 perms
        - 5) Resistance to Deterioration from Organisms and Substances in Contacting Soil: 0.0198 perms.
    - b. Puncture Resistance (ASTM D1709): >3,500 grams.
    - c. Tensile Strength ASTM E154, Section 9: 52 Lb. Force/Inch
    - d. Proprietary-Based Specification: PERMINATOR 10 mil by W. R. Meadows.
- B. Bituminous Dampproofing (Type B)
  - Spray applied air and vapor barrier membrane shall be qual to Seaboard asphalt Products EF-400.

1.

#### 2.3 ACCESSORIES

- A. Plastic Vapor Retarder (Type A)
  - 1. Seam Tape a. Hig
    - Ĥigh Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 4" (100 mm).
  - 2. Pipe Collars
    - a. Construct pipe collars from vapor retarder material and pressure sensitive tape per manufacturer's instructions.

#### PART 3 EXECUTION

#### 3.1 SURFACE PREPARATION

- A. Prepare surfaces in accordance with manufacturer's instructions.
- B. Level, tamp, or roll earth or granular material beneath the slab base.

#### 3.2 EXAMINATION

A. Examine surfaces to receive membrane. Notify architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

#### 3.3 APPLICATION

- A. Install the vapor retarder membrane in accordance with manufacturer's instructions and ASTM E 1643–98.
- B. Unroll vapor retarder with the longest dimension parallel with the direction of the pour.
- C. Lap vapor retarder over footings and seal to foundation walls.
- D. Overlap joints 6" (152 mm) and seal with manufacturer's tape.
- E. Seal all penetrations (including pipes) with manufacturer's pipe boot.
- F. No penetration of the vapor retarder is allowed except for reinforcing steel and permanent utilities.
- G. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6" (152 mm) and taping all four sides with tape.

#### END OF SECTION

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# SECTION 07 27 26 FLUID APPLIED MEMBRANE AIR BARRIERS

#### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Application of liquid applied asphalt emulsion air/vapor barrier.

#### C. Application of materials to provide bridge and seal air leakage pathways in

- 1. Wall and roof connections and penetrations.
- 2. Connections to foundation walls.
- 3. Walls, windows, curtain walls, storefronts, louvers or doors
- 4. Expansion and control joints.
- 5. Masonry ties.
- 6. All other penetrations through the wall assembly.

#### 1.2 RELATED SECTIONS

- A. Section 04 20 00 Unit Masonry.
- B. Section 07 21 00 Thermal Insulation.
- C. Section 07 71 00 Manufactured Roof Specialties.
- D. Section 07 90 00 Joint Protection.
- E. Section 08 11 00 Steel Doors and Frames.
- F. Section 08 41 00 Aluminum Entrances and Storefronts.
- G. Section 09 26 00 Gypsum Board Systems.

#### 1.3 REFERENCES

- A. ASTM D146-97 Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Fabrics Used in Roofing and Waterproofing.
- B. ASTM D412-98a(2002)e1 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- C. ASTM E96-00e1 (Method B) Standard Test Methods for Water Vapor Transmission of Materials.
- D. ASTM E283-91 (1999) Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- E. ASTM E783 Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
- F. ASTM E1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference.

#### FLUID APPLIED MEMBRANE AIR BARRIERS

- G. ASTM E2178-01 Standard Test Method for Air Permeance of Building Materials.
- H. ASTM E2357 05 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

#### 1.4 SUBMITTALS

- A. Comply with Section 01 33 00 Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. Air Barrier Installer shall be currently accredited under the Air Barrier Association of America (ABAA) and ensure applicators are certified in accordance with the ABAA Quality Assurance Program.
- B. Obtain air/vapor barrier materials from a single manufacturer regularly engaged in manufacturing the product.
- C. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

#### 1.7 PRECONSTRUCTION MEETING

A. Preconstruction Meeting: Convene one week prior to commencing Work of this section, in accordance with Section 01 31 00.

#### 1.8 MOCK-UPS

- A. Prior to installation of air/vapor barrier, apply air/vapor barrier as follows to verify details under shop drawing submittals and to demonstrate tie-ins with adjoining construction, and other termination conditions, as well as qualities of materials and execution.
- B. Apply air barrier in field-constructed mock-ups of assemblies specified in Section 09 26 00.
- C. Apply air/vapor barrier in field-constructed mock-ups of assemblies specified in Section 01 60 00.
- D. Construct typical exterior wall panel, 8 feet long by 8 feet wide, incorporating back-up wall, cladding, window and doorframe and sill, insulation, flashing, building corner condition, junction with roof system, foundation wall, and typical penetrations and gaps; illustrating materials interface and seals.
- E. Test mock-up in accordance with ASTM E783 and ASTM E1105 for air and water infiltration.
- F. Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed air and vapor barrier membrane unless it has been inspected, tested and approved.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

- B. Store materials in a clean dry area in accordance with manufacturer's instructions.
- C. Store at temperatures above 32°F, free from contact with cold or frozen surfaces.
- D. Protect materials during handling and application to prevent damage or contamination.

# 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Product not intended for uses subject to abuse or permanent exposure to the elements.
- B. Do not proceed with product application during rain or inclement weather.
- C. Do not apply membrane when air or surface temperatures are below  $30^{\circ}F(-1^{\circ}C)$ .
- D. Do not apply to frozen substrate.

#### PART 2 PRODUCTS

# 2.1 ACCEPTABLE MANUFACTURERS

- A. W. R. Meadows, Inc. (Basis of Design)
- B. W. R. Grace.
- C. SIKA.
- D. Carlisle (Barritech VP)
- E. Substitutions in accordance with Section 01 60 00.

#### 2.2 MATERIALS

- A. Liquid Air Vapor Barrier System: One component, polymer modified, cold applied liquid air/vapor barrier membrane.
  - 1. Performance Based Specification: Air/vapor barrier membrane shall be an elastomeric asphalt emulsion having the following characteristics:
    - a. Air Permeability ASTM E2357:  $0.04 \text{ cfm} / \text{ft}^2 @ 75 \text{ Pa} (1.57 \text{ lbs. } / \text{ft}^2)$ .
    - b. Air Permeability ASTM E2178:  $0.004 \text{ cfm} / \text{ft}^2 @ 75 \text{ Pa} (1.57 \text{ lbs. } / \text{ft}^2).$
    - c. Water Vapor Permeance ASTM E96 (Method B): ≤0.1 perms.
    - d. Elongation ASTM D412: 1500 %.
    - e. Tensile Strength ASTM D412: 15 psi.
  - 2. Proprietary Based Specification: AIR-SHIELD LM by W. R. MEADOWS.

#### 2.3 ACCESSORIES

- A. Flashing and Transition Membrane: Self-adhesive polymeric air/vapor barrier membrane having a thickness of 40 mils (1 mm).
  - 1. AIR-SHIELD THRU-WALL FLASHING by W. R. MEADOWS.
- B. Detailing Compound: Single component joint filler for exterior sheathing panels.
  1. AIR SHIELD JOINT FILLER by W.R. MEADOWS.
- C. Liquid Flashing: Fluid applied, single component, flashing membrane for rough openings.
   1. AIR SHIELD LIQUID FLASHING by W.R. MEADOWS.

- D. Joint Tape: Self-adhesive polymeric membrane for joints of plywood and oriented strand board (OSB).
  - 1. AIR SHIELD by W.R. MEADOWS.
- E. Primer:

2.

- 1. Temperatures above 40°F (4°C): Water Based Primer
  - a. MEL-PRIME<sub>TM</sub> W/B Water Base Primer by W. R. MEADOWS.
  - Temperatures below 30°F (-1°C): Solvent Based Primer.
    - a. MEL-PRIME VOC Compliant Solvent-Base Primer or Standard Solvent-Base Primer by W. R. MEADOWS.
- F. Pointing Mastic: mastic for sealing penetrations and terminations of membrane.
  - 1. POINTING MASTIC by W.R. MEADOWS.
- G. Concrete Repair Materials: general purpose patching materials.
  - 1. MEADOW-PATCH<sup>™</sup> 5 and 20 Concrete Repair Mortars by W.R. MEADOWS.

# PART 3 EXECUTION

# 3.1 EXAMINATION

A. Examine surfaces to receive membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

#### 3.2 SURFACE PREPARATION

- A. Protect adjacent surfaces not designated to receive air/vapor barrier.
- B. Clean and prepare surfaces to receive air/vapor barrier membrane in accordance with manufacturer's instructions.
- C. Do not apply membrane to surfaces unacceptable to manufacturer.
- D. Concrete surfaces must be clean, free of standing water, ice, snow, frost, dust, dirt, oil, curing compounds or any other foreign material that could prevent proper adhesion of the membrane.
- E. Patch all holes and voids and smooth out any surface misalignments.
- F. Patch all cracks, protrusions, small voids, offsets, details, irregularities and small deformities with cementitious patching mortar at least two hours before application.
- G. Ensure joints between dissimilar building materials are sealed with a strip of selfadhesive membrane 6" (150 mm) wide, centered over the joint.
- H. Exterior Sheathing Panels:
  - 1. Install and fasten exterior sheathing panels according to the sheathing manufacturer's instructions.
  - 2. Treat all countersunk and removed fasteners with joint filler or liquid flashing material.
  - 3. Inspect the joint to ensure that all areas to receive joint treatment are clean, dry, smooth, and free from all bond-breaking contaminants.
  - 4. Remove and replace any damaged structural wall components.
  - 5. Joint Treatment using joint filler
    - a. Fill joint area with joint filler using a spreader tool or 3" putty knife.
    - b. Extend the joint filler beyond the joint line 3" onto face of exterior sheathing.

#### FLUID APPLIED MEMBRANE AIR BARRIERS

- c. Fully embed 3" wide reinforcing fabric into the wet joint filler, centered over the joint.
- d. Run the spreader tool or putty knife over the embedded reinforcing fabric to remove any air bubbles.
- I. Plywood and Oriented Strand Board (OSB):
  - 1. Boards are to be fastened according to board manufacturer.
  - 2. Apply self-adhesive membrane over all joints.

# 3.3 APPLICATION OF AIR BARRIER SYSTEM

- A. Transition Membrane
  - 1. Prime surfaces to be covered in one working day with applicable primer.
  - 2. Apply transition membrane with a minimum overlap of 3" onto primed surface at all joints, columns, beams and dissimilar materials.
  - 3. Roll membrane firmly into place.
  - 4. Ensure membrane is fully adhered and remove all wrinkles and fish mouths.
  - 5. Overlap subsequent courses of membrane a minimum of 2" and ensure joints are fully adhered.
  - 6. Seal top edge of transition membrane with pointing mastic.
- B. Rough Opening Transition Membrane

c.

- 1. Fluid Applied Transition Membrane using liquid flashing membrane
  - a. Apply a coat of primer on the raw edges of exterior gypsum board.
    - b. Treatment of joints or cracks larger than  $\frac{1}{4}$  and less than  $\frac{1}{2}$ .
      - i. Prefill any joints or cracks with the liquid flashing material.
      - ii. Apply a generous bead of material over the joint.
      - iii. Press and spread liquid flashing into the joint.
      - iv. Allow material to skin over prior to full application of liquid flashing into the rough opening.
      - Treatment of joints or cracks larger than  $\frac{1}{2}$ "
        - i. Install backer rod into the joint to control depth of liquid flashing material.
        - ii. Apply a generous bead of material over and into the joint.
        - iii. Press and spread liquid flashing into the joint.
        - iv. Smooth out using a spreader tool or putty knife
        - v. Allow material to cure prior to full application of liquid flashing into the rough opening.
    - d. Apply a bead of liquid flashing in the rough opening starting at the top and continuing around the rough opening.
    - e. Spread the material using a spreader tool or putty knife across the rough opening surface.
    - f. Test the material thickness using a wet mil gauge to ensure that it has a thickness of 12-15 mils.
    - g. Apply a generous bead of liquid flashing material to the vertical surface around the rough opening and spread this material 4" 6" onto the vertical surface with a spreader tool or putty knife.
    - h. Test the thickness to ensure the material has a thickness of 12-15 mils.
    - i. Allow liquid flashing material to dry before installing any windows, doors, wall assembly, and full air barrier material.
- B. Through Wall Flashing
  - 1. Prime surfaces to be covered in one working day with applicable primer.
  - 2. Remove release paper prior to application.
  - 3. Apply through wall flashing at based of masonry walls as indicated on drawings.
  - 4. Recess through wall flashing 1/2" from the face of the masonry.

- 5. Apply a bead of pointing mastic if through wall flashing is not embedded into masonry.
- C. Air Barrier Membrane
  - 1. Apply air/vapor barrier membrane in accordance with manufacturer's instructions.
  - 2. Thoroughly mechanically mix membrane prior to application.
  - 3. Apply membrane by spray or roller at a minimum coverage rate of 20-25 ft<sup>2</sup>/gal. (60 mils wet, 45 mils dry). Two coats (30 mils wet) may be necessary.
  - 4. Frequently inspect surface area with a wet mil gauge to ensure consistent thickness.
  - 5. Work material into any fluted rib forming indentations.
  - 6. Cured thickness of membrane should be 45 mils dry.
  - 7. Avoid use of products which contain tars, solvents, pitches, polysulfide polymers, or PVC materials that may come into contact with air/vapor barrier system.

#### 3.4 **PROTECTION**

A. Cover air/vapor barrier membrane as soon as possible, since it is not designed for permanent exposure.

# END OF SECTION

#### SECTION 07 42 13 METAL WALL PANELS

#### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section includes preformed metal siding system for walls, and soffits, with insulation, related flashings and accessory components.
  - 1. Provide building paper back-up over gypsum sheathed walls.
- B. Related Sections:
  - 1. Section 05 12 00 Structural Steel Framing: Structural steel building frame.
  - 2. Section 05 40 00 Cold-Formed Metal Framing: Stud wall framing system.
  - 3. Section 07 21 00 Thermal Insulation.
  - 4. Section 07 26 00 Vapor Retarders.
  - 5. Section 07 27 26 Fluid Applied Membrane Air Barriers.

#### 1.2 REFERENCES

- A. American Society of Civil Engineers:
  - 1. ASCE 7 Minimum Design Loads for Buildings and Other Structures.
- B. ASTM International:
  - 1. ASTM A606 Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
  - 2. ASTM A666 Standard Specification for Austenitic Stainless-Steel Sheet, Strip, Plate, and Flat Bar.
  - 3. ASTM A755/A755M Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
  - 4. ASTM A792/A792M Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  - 5. ASTM A924/A924M Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - 6. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 7. ASTM C665 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - 8. ASTM D226 Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
  - 9. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

#### 1.3 SYSTEM DESCRIPTION

A. System: Preformed and prefinished metal siding system of horizontal and vertical profile; site assembled.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Components: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with applicable code.
  - 1. Design Pressure: Minimum 20 lb./sq. ft.

#### METAL WALL PANELS

- B. Maximum Allowable Deflection of Panel: 1/140 of span.
- C. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.
- D. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
- E. Products: Provide continuity of thermal barrier at building enclosure elements in conjunction with thermal insulating materials.
- F. Vapor Retarder: Provide continuity of vapor retarder at building enclosure elements in conjunction with vapor retarders specified in Section 07 26 00.
- G. Air Seal: Provide continuity of air barrier seal at building enclosure elements in conjunction with air seal materials specified in Section 07 27 26.

#### 1.5 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate dimensions, layout, joints, expansion joints, construction details, methods of anchorage, and interface with adjacent materials.
- C. Product Data: Submit data on panels.
- D. Design Data: Submit design calculations.
- E. Samples: Submit two samples of siding, 12 x 12 inch in size illustrating finish color, sheen, and texture.
- F. Manufacturer's Installation Instructions: Submit special procedures.

#### 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with manufacturer's standards.
- B. Maintain one copy of each document on site.

#### 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience approved by manufacturer.
- C. Design Metal Siding under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Maryland.
- 1.8 DELIVERY, STORAGE, AND HANDLING
  - A. Section 01 60 00 Product Requirements: Product storage and handling requirements.

- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. Store prefinished material off ground protected from weather, to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- D. Prevent contact with materials capable of causing discoloration or staining.
- 1.9 COORDINATION
  - A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
  - B. Coordinate Work for installation of vapor retarder and air barrier seals.
  - C. Coordinate Work with installation of adjacent components or materials.

#### 1.10 WARRANTY

- A. Section 01 77 00 Closeout Procedures: Product warranties and product bonds.
- B. Furnish five-year manufacturer warranty for metal siding.

# PART 2 PRODUCTS

# 2.1 MANUFACTURED METAL SIDING

- A. Manufacturers:
  - 1. AEP-Span Model 12"
  - 2. American Building Roofing Model 12"
  - 3. Atas International Inc.
  - 4. Metal-Fab Manufacturing LLC Model MET-FAB 12"
  - 5. Fabral Model
  - 6. Substitutions: Section 01 60 00 Product Requirements

#### 2.2 COMPONENTS

- A. Exterior Panel and Other Sheet Materials: Minimum 0.040-inch-thick precoated aluminum stock; 12 inches wide panel; interlocking edges with 1" reveal.
- B. Soffit Panels: 0.040-inch-thick pre-coated aluminum alloy, profile in 12-inch-wide panels with 1" reveal; lapped edges.

#### 2.3 ACCESSORIES

- A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant; color as selected.
- B. Sealants: Specified in Section 07 90 00. Manufacturer's standard type suitable for use with installation of system; non-staining, non-shrinking and non-sagging; color as selected.
- C. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers; fastener cap same color as exterior panel.
- D. Power Actuated Fasteners: Steel, hot dip galvanized; with soft neoprene washers, fastener cap same color as exterior panel.
- E. Field Touch-up Paint: As recommended by panel manufacturer.
- F. Bituminous Paint: Asphalt base.
- G. Building Paper: ASTM D226; Type II, No. 30 unperforated asphalt felt.

# 2.4 FABRICATION

- A. Form sections to shape indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practicable lengths.
- C. Panel Profile: Manufacturer's standard profile as indicated on Drawings for specified system.
- D. Fabricate corners in one continuous piece with minimum 12-inch returns.

# PART 3 EXECUTION

# 3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Verify building framing members are ready to receive panel system.

# 3.2 INSTALLATION - BUILDING PAPER

- A. Install 1-layer building paper horizontally on walls to receive metal siding.
- B. Weather lap edges 6 inches and ends minimum 6 inches, minimum.
- C. Stagger vertical joints of each layer.
- D. Securely fasten in place.

# 3.3 INSTALLATION

- A. Protect surfaces in contact with dissimilar metals with bituminous paint. Allow to dry prior to installation.
- B. Fasten siding to structural supports; aligned, level, and plumb. Space fasteners maximum 24 inches on center either horizontally or vertically to suit application.
- C. Locate joints over supports. Lap panel ends minimum 2 inches.
- D. Install control joints where indicated.
- E. Use concealed fasteners unless otherwise approved by Architect/Engineer.
- F. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

# 3.4 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

- B. Maximum Offset from Indicated Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- C. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

# 3.5 CLEANING

- A. Section 01 77 00 Closeout Procedures: Final cleaning.
- B. Remove site cuttings from finish surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

# 3.6 SCHEDULES

- A. High side walls at new standing seam roof area. Run horizontal perpendicular to framing.
- B. Soffit all locations run perpendicular to framing.

# END OF SECTION

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#### SECTION 07 42 43 COMPOSITE WALL PANELS

# PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section includes preformed metal panel system for walls with insulation, related flashings and accessory components.
- B. Related Sections:
  - 1. Section 05 12 00 Structural Steel Framing: Structural steel building frame.
  - 2. Section 05 40 00 Cold-Formed Metal Framing: Stud wall framing system.

#### 1.2 REFERENCES

- A. Aluminum Association:
  - 1. AA ADM 1 Aluminum Design Manual.
  - 2. AA ASM 35 Aluminum Sheet Metal Work in Building Construction.
- B. American Society of Civil Engineers:
  - 1. ASCE 7 Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International:
  - 1. ASTM A666 Standard Specification for Austenitic Stainless-Steel Sheet, Strip, Plate, and Flat Bar.
  - 2. ASTM A755/A755M Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
  - 3. ASTM A792/A792M Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  - 4. ASTM A924/A924M Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - 5. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 6. ASTM B209M Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
  - 7. ASTM C177 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
  - 8. ASTM C665 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - 9. ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
  - 10. ASTM D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
  - 11. ASTM D2482 Standard Test Method for Surface Strength of Paper (Wax Pick Method).
  - 12. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 13. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
  - 14. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
  - 15. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  - 16. ASTM E413 Standard Classification for Rating Sound Insulation.

- D. National Fire Protection Association:
  - 1. NFPA 255 Standard Method of Test of Surface Burning Characteristics of Building Materials.
  - 2. NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus.
- E. Underwriters Laboratories Inc.:
  - 1. UL 723 Tests for Surface Burning Characteristics of Building Materials.

# 1.3 SYSTEM DESCRIPTION

A. System: Preformed and prefinished composite metal building panel system of horizontal and vertical profile; site assembled; thermoplastic compound core; with concealed fasteners.

# 1.4 PERFORMANCE REQUIREMENTS

- A. Components: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with applicable code.
  - 1. Design Pressure: 20 lb./sq. ft.
- B. Maximum Allowable Deflection of Panel: 1/180.
- C. Movement: Accommodate movement within system without damage to system, components, or deterioration of seals; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
- D. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
- E. Tolerances: Accommodate tolerances of building structural framing.
- F. Thermal Resistance of System: R of 0.86.
- G. Products: Provide continuity of thermal barrier at building enclosure elements in conjunction with adjacent thermal insulating materials.

# 1.5 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Signed and sealed by professional engineer.
  - 1. Indicate dimensions, panel profile and layout, spans, joints, expansion joints, construction details, methods of anchorage, method and sequence of installation and interface with adjacent materials.
  - 2. Include design calculations.
- C. Product Data:
  - 1. Submit panel profile characteristics and dimensions, and structural properties.
  - 2. Submit data on assembled panel structural capabilities.
- D. Samples: Submit two samples of 12 x 12 inch in size illustrating finish color, sheen, and texture.

- E. Manufacturer's Installation Instructions: Submit special handling criteria, installation sequence, and cleaning procedures.
- 1.6 QUALITY ASSURANCE
  - A. Perform Work in accordance with AA ASM-35.
  - B. Surface Burning Characteristics:
    - 1. Composite Panels: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
  - C. Full Scale Fire Tests: Comply with NFPA 285, when tested in maximum thickness intended for use.

#### 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience approved by manufacturer.
- C. Design metal panels under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location in State of Maryland.

# 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 Product Requirements: Product storage and handling requirements.
- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. Store pre-finished material off ground with weather protection to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- D. Prevent contact with materials capable of causing discoloration or staining.

### 1.9 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with placement of anchors.
- C. Coordinate Work for installation of vapor retarder and air barrier seals.
- D. Coordinate Work with installation of windows and adjacent components and materials.

# 1.10 WARRANTY

- A. Section 01 77 00 Closeout Procedures: Product warranties and product bonds.
- B. Furnish five-year manufacturer warranty for composite panels.

# PART 2 PRODUCTS

## 2.1 COMPOSITE METAL BUILDING PANELS

- A. Manufacturers:
  - 1. Laminators Incorporated, Model: Omega-Lite.
  - 2. Cap, Model: Tecpan.
  - 3. Mitsubishi Chemical America, Inc, Model: Apolic Rout and Return
  - 4. Substitutions: Section 01 60 00 Product Requirements.

#### 2.2 COMPONENTS

- A. Panel shall be smooth metal faced panels with an impact-resistant ribbed polyethylene core. Stabilized to reduce the expansion and contraction and the oil-canning of ordinary metal panels. A three-layer structural-adhesive bonded construction of metal faces, and ribbed polyethylene core. The metal faces shall be 0.32 smooth aluminum with standard Kynar color finish.
  - 1. Precoated metal sheets conforming to ASTM B 209 aluminum and aluminum alloy sheet and plate. The faces will be prefinished with corrosion resistant primers and will be color coated with full strength Kynar (20) year color.
  - 2. Standard panel thickness will be 5/16" nominal.
- B. Core: Ribbed Polyethylene Core.
- C. Back: .015 aluminum.

#### 2.3 ACCESSORIES

- A. Gaskets: Manufacturer's standard type suitable for use with panel system, permanently resilient; ultraviolet and ozone resistant; color to match siding.
- B. Sealants: Specified in Section 07 90 00. Manufacturer's standard type suitable for use with installation of panel system; non-staining, non-shrinking and non-sagging; ultraviolet and ozone resistant; color to match siding.
- C. Fasteners: Manufacturer's standard type to suit application; stainless steel; fastener cap same color as exterior panel.
- D. Field Touch-up Paint: As recommended by panel manufacturer.

# 2.4 FABRICATION

- A. Fabrication of primary component profiles on site is not permitted.
- B. Form sections to shape indicated on Drawings, accurate in size, square, and free from distortion or defects.
- C. Form pieces in longest practicable lengths.
- D. Form panels for flush seams.

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify building framing members are ready to receive panel system.

# 3.2 INSTALLATION

- A. Protect panel surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.
- B. Permanently fasten panel system to structural supports; aligned, level, and plumb, within specified tolerances.
- C. Locate panel joints over supports.
- D. Install control joints where indicated.
- E. Use concealed fasteners wherever possible.
- F. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

# 3.3 ERECTION TOLERANCES

- A. Section 01 40 00 Quality Requirements: Tolerances.
- B. Maximum Offset from Indicated Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- C. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.

# 3.4 CLEANING

- A. Section 01 77 00 Closeout Procedures: Final cleaning.
- B. Remove site cuttings from finish surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

# 3.5 SCHEDULES

A. Rake fascia at new addition gabble roof.

# END OF SECTION

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# SECTION 07 54 19

# POLYVINYL-CHLORIDE (PVC-TPA) ROOFING

PART 1 - GENERAL

# 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

# 1.2 SUMMARY

# A. Section Includes:

- 1. Adhered polyvinyl-chloride (PVC) roofing system on concrete deck, including:
- 2. Roof insulation.
- B. Related Sections:
  - 1. Section 06 11 40 Wood Blocking and Curbing for wood nailers, curbs, and blocking.
  - 2. Section 07 21 00 Thermal Insulation.
  - 3. Section 07 71 00 Manufactured Roof Specialties for metal roof penetration flashings, flashings, and counterflashings.
  - 4. Section 07 90 00 Joint Protection for joint sealants, joint fillers, and joint preparation.
  - 5. Division 22 Plumbing for roof drains.

# 1.3 DEFINITIONS

A. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

# 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Base flashings and membrane terminations.
    - a. Indicate details meet requirements of NRCA and FMG required by this Section.
  - 2. Tapered insulation, including slopes.
  - 3. Roof plan showing orientation of steel roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened membrane roofing.
  - 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
- C. Samples for Verification: For the following products:
  - 1. Sheet roofing, of color specified, including T-shaped side and end lap seam.
  - 2. Roof insulation.
  - 3. Roof paver in each color and texture required.
  - 4. Walkway pads or rolls.
  - 5. Metal termination bars.

# 1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Qualification Data: For Installer, Manufacturer, and Roofing Inspector.
  - 1. Include letter from Manufacturer written for this Project indicating approval of Installer.
- C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
  - 1. Submit evidence of compliance with performance requirements.
  - 2. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing membrane, flashing sheets, adhesives, and sealants.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
- E. Research/Evaluation Reports: For components of membrane roofing system, from ICC-ES.
- F. Warranties: Unexecuted sample copies of special warranties.
- G. Inspection Reports: Daily reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions taken to correct defective work.

# 1.6 INFORMATIONAL SUBMITTALS

A. Maintenance Data: To include in maintenance manuals.

# 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Manufacturer Qualifications: UL listed and FM Approvals approved for roofing systems identical to those specified for this Project and listed in this Section, with minimum five years' experience in manufacture of comparable products in successful use in similar applications, and able to furnish warranty with provisions matching specified requirements.
  - 1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
    - a. Product data, including certified independent test data indicating compliance with requirements.
    - b. Samples of each component.
    - c. Sample submittal from similar project.
    - d. Project references: Minimum of five installations of specified products not less than five years old, with Owner and Architect contact information.
    - e. Sample warranty.

- 2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
- 3. Approved manufacturers must meet separate requirements of Submittals Article.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
  - 1. An authorized full-time technical employee of the manufacturer.
- D. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
  - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
  - 5. Review structural loading limitations of roof deck during and after roofing.
  - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
  - 7. Review governing regulations and requirements for insurance and certificates if applicable.
  - 8. Review temporary protection requirements for roofing system during and after installation.
  - 9. Review roof observation and repair procedures after roofing installation.
- E. Preinstallation Roofing Conference: Conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
  - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
  - 5. Review structural loading limitations of roof deck during and after roofing.
  - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
  - 7. Review governing regulations and requirements for insurance and certificates if applicable.
  - 8. Review temporary protection requirements for roofing system during and after installation.
  - 9. Review roof observation and repair procedures after roofing installation.

# 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
  - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

# 1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

# 1.10 WARRANTY

- A. Warranty, General: Warranties specified shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Manufacturer's Warranty: Manufacturer's standard or customized form, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
  - 1. Manufacturer's warranty includes roofing membrane, base flashings, fasteners, roofing membrane accessories roof insulation roof pavers, walkway products and other components of roofing system.
  - 2. Warranty Period: 20-year NDL (No Dollar Limit) Total System Warranty from date of Substantial Completion
- C. Manufacturer Inspection and Preventive Maintenance Requirement: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's annual inspections and preventive maintenance is included in the Contract Sum. Inspections to occur in Years 2, 5, 10 and 15 following completion.
- D. Installer's Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section and Work of related Sections

listed in "Roof System Warranty" Paragraph above, including all components of roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period:

- 1. Warranty Period: Two years from date of Substantial Completion.
- E. Extended Roof System Warranty: Warranties specified in this Section include the following components and systems specified in other sections supplied by the roofing system Manufacturer , and installed by the roofing system Installer:
  - 1. Sheet metal flashing and trim, including roof penetration flashings.
  - 2. Manufactured copings, roof edge, counterflashings, and reglets.
  - 3. Roof curb, hatch, and penetration flashings.
  - 4. Roof and parapet expansion joint assemblies.
  - 5. Metal wall, soffit panels, and trim.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer/Product: The roof system specified in this Section is based upon Tremco, Inc. products named in other Part 2 articles. Subject to compliance with requirements, provide the named product or an approved comparable product.
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

# 2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
  - 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
  - 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
- C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.
  - 1. Corner, Perimeter, and Field-of-Roof Uplift Pressures: As indicated on Drawings.
- D. SPRI Wind Design Standard: Manufacture and install copings and roof-edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:
  - 1. Design Pressure: As indicated on Drawings.
- E. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4450 or FM Global 4470 as part of a roofing system.
  - 1. Fire/Windstorm Classification: Class 1-90.

- 2. Hail Resistance: MH.
- F. Flashings: Comply with requirements of Section 07 71 00. Provide base flashings, perimeter flashings, detail flashings and component materials that comply with requirements and recommendations of the following:
  - 1. FM Global 1-49: Loss Prevention Data Sheet for Perimeter Flashings.
  - 2. FM Global 1-29: Loss Prevention Data Sheet for Above Deck Roof Components.
  - 3. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
  - 4. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.
- G. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- H. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- I. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- J. Energy Star Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- K. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

# 2.3 PVC MEMBRANE ROOFING

- A. Thermoplastic Tri-Polymer Alloy (TPA) Sheet: ASTM D 4434, Type IV, internally fabric reinforced, uniform, flexible TPA sheet; Energy Star qualified, CRRC listed and California Title 24 Energy Code compliant.
  - 1. Basis of design product: Tremco, TPA Roof Membrane.
  - 2. Tensile Strength at 0 deg. F (-18 deg. C), minimum, ASTM D 751: 300 lbf/in (52 kN/m).
  - 3. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D 751: 100 lbf (440 N).
  - 4. Elongation at 0 deg. F (-18 deg. C), minimum at fabric break, ASTM D 751: machine direction, 25 percent; cross machine direction, 25 percent.
  - 5. Minimum Thickness, ASTM D 751: 60 mils (1.5 mm), nominal.
  - 6. Exposed Face Color: White.
  - 7. Reflectance, ASTM C 1549: 86 percent.
  - 8. Thermal Emittance, ASTM C 1371: .86.
  - 9. Solar Reflectance Index (SRI), ASTM E 1980: 108
  - 10. Recycled Content, Minimum: 25 percent preconsumer.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.

# 2.4 AUXILIARY MEMBRANE ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
  - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

- 2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - a. Plastic Foam Adhesives: 50 g/L.
  - b. Gypsum Board and Panel Adhesives: 50 g/L.
  - c. Multipurpose Construction Adhesives: 70 g/L.
  - d. Fiberglass Adhesives: 80 g/L.
  - e. Contact Adhesive: 80 g/L.
  - f. Other Adhesives: 250 g/L.
  - g. PVC Welding Compounds: 510 g/L.
  - h. Adhesive Primer for Plastic: 650 g/L
  - i. Single-Ply Roof Membrane Sealants: 450 g/L.
  - j. Nonmembrane Roof Sealants: 300 g/L.
  - k. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 1. Sealant Primers for Porous Substrates: 775 g/L.
- 3. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Single Ply Membrane Bonding Adhesive, Low VOC: Elastomeric, low-VOC solvent-based contact-type adhesive for bonding TPA non-fleece-backed single ply membranes and flashings to substrates.
  - 1. Basis of design product: Tremco, TPA/LV Single Ply Bonding Adhesive.
  - 2. Asbestos Content, EPA/600/R-93/116: None.
  - 3. VOC, maximum, ASTM D 3960: 200 g/L.
- C. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- D. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch (25 mm wide by 1.3 mm) thick, prepunched.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosionresistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- F. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

# 2.5 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by PVC membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Approvals-approved roof insulation.
- B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, approved and listed by FM Global for windstorm and fire characteristics specified, CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces. CCMC listed.
  - 1. Compressive Strength, ASTM C1621: Grade 2: 20 psi (138 kPa).

- 2. Conditioned Thermal Resistance at 75 deg. F (24 deg. C): 14.4 at 2.5 inches (50.8 mm) thick.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

# 2.6 INSULATION ACCESSORIES

- A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosionresistance provisions in FM Approvals 4470, designed for fastening roof insulation] to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Two-component, solvent-free, low odor, elastomeric urethane adhesive formulated to adhere roof insulation to substrate.
  - 1. Basis of design product: Tremco, Low Rise Foam Insulation Adhesive.
  - 2. Flame Spread Index, ASTM E 84: 10.
  - 3. Smoke Developed Index, ASTM E 84: 30.
  - 4. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 0 g/L.
  - 5. Tensile Strength, minimum, ASTM D 412: 250 psi (1724 kPa).
  - 6. Peel Adhesion, minimum, ASTM D 903: 17 lbf/in (2.98 kN/m).
  - 7. Flexibility, 70 deg. F (39 deg. C), ASTM D 816: Pass.
- D. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

# 2.7 ASPHALT MATERIALS

- A. Asphalt Primer, Water-Based: Water-based, polymer modified, asphalt primer.
  - 1. Asbestos Content, EPA 600/R13/116: None.
  - 2. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 2 g/L.

# 2.8 WALKWAYS

- A. TPA Walkway Roll: Thermoplastic tri-polymer alloy reinforced elastomeric membrane roll, ASTM D 4434, with serrated, slip-resistant surface fabricated for heat welding to TPA tripolymer alloy membrane surface.
  - 1. Roll Size: 36 inches by 60 foot (914 mm by 18.3 m).
  - 2. Thickness: 0.08 inch (2 mm).

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
  - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.

- 2. Concrete Roof Deck:
  - a. Verify that minimum concrete drying period recommended by roofing manufacturer has passed.
  - b. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
  - c. Test for moisture by pouring 1 pint (0.5 L) of hot roofing asphalt on deck at start of each day's work and at start of each roof area or plane. Do not proceed with roofing work if test sample foams or can be easily and cleanly stripped after cooling.
  - d. Verify that concrete curing compounds that will impair adhesion of roofing components to roof deck have been removed.
- 3. Verify that existing insulation and substrate is sound and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Prime surface of concrete deck with asphalt primer at a rate of 3/4 gal./100 sq. ft. (0.3 L/sq. m) and allow primer to dry.

# 3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's recommendations.
- B. Install wood cants, blocking, curbs, and nailers in accordance with requirements of Section 06 11 40.
- C. Install roofing membrane, base flashings, and component materials in compliance with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system as listed in FMG's "Approval Guide" for fire/windstorm classification indicated. Comply with recommendations in FMG Loss Prevention Data Sheet 1-49.
- D. NRCA Installation Details: Install roofing system in accordance with the following NRCA Manual Plates and NRCA recommendations; modify as required to comply with requirements of FMG references above:
  - 1. Base Flashing at Parapet Wall: Plates TP-1 and TP-1S.
  - 2. Base Flashing and Counterflashing at Parapet Wall: Plates TP-5 and TP-5S.
  - 3. Base Flashing and Counterflashing at Parapet Wall, Movement Joint: Plates TP-6 and TP-6S.
  - 4. Base and Surface-mounted Counterflashing: Plates TP-4 and TP-4S.
  - 5. Perimeter Edge, Raised: Plates TP-2 and TP-2S.
  - 6. Perimeter Edge, Embedded Edge: Plates TP-3 and TP-3S.

- 7. Perimeter Edge, Draining: Plates TP-3A and TP-3AS.
- 8. Options for Perimeter Base Securement (Roof-to-Wall and Roof-to-Curb Intersections) Single Ply Table 7.1
- 9. Options for Perimeter Base Securement (Roof-to-Wall and Roof-to-Curb Intersections) Single Ply Table 7.2
- 10. Scupper, Raised: Plates TP-21 and TP-21S.
- 11. Gutter at Draining Edge: Plates TP-22 and TP-22S.
- 12. Expansion Joint, with metal cover: Plates TP-7 and TP-7S and Division 7 Section "Sheet Metal Flashing and Trim."
- 13. Curb Detail at Rooftop HVAC Units, Manufactured: Plates TP-12 and TP-12S.
- 14. Curb Detail at Rooftop HVAC Units, Job-Built, Wood: Plates TP-13 and TP-13S.
- 15. Curb Detail at Skylight, Roof Hatch, and Smoke Vents: Plates TP-14 and TP-14S.
- 16. Penetration, Structural Member: Plates TP-15 and TP-15S.
- 17. Penetration, Sheet Metal Enclosure: Plates TP-16 and TP-16S.
- 18. Penetration, Stack Flashing: Plates TP-17 and TP-17S.
- 19. Penetration, Plumbing Vent: Plates TP-18 and TP-18S.
- 20. Penetration, Plumbing Vent, Manufactured Boot: Plates TP-18A and TP-18AS.
- 21. Penetration, Pocket: Plates TP-19 and TP-19S.
- 22. Roof Drain: Plates TP-20 and TP-20S.

# 3.4 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (68 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
  - 1. Install insulation at average overall thickness of minimum 6 inches.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
  - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
  - 1. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

# 3.5 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.
  - 1. Install sheet according to ASTM D 5036.

- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
- E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.
- F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- G. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
  - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
  - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
  - 3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- H. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

# 3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars 6" o.c. with gasketed tape.

# 3.7 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.
- B. Roof-Paver Walkways: Install walkway roof pavers according to manufacturer's written instructions in locations indicated, to form walkways. Leave 3 inches (75 mm) of space between adjacent roof pavers.

# 3.8 FIELD QUALITY CONTROL

- A. Inspection: Contractor must have a full-time inspector on site for nine hours each per every five days worked. Technical Inspector must have been employed by the manufacturer for a five-year period. Technical Inspector must provide daily reports with photographs. Submittal paperwork must be provided showing the onsite technical inspector of the manufacturer has built-up roofing inspection experience of a minimum of 5 years.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

# 3.9 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

# END OF SECTION

### SECTION 07 61 03 MANUFACTURED SHEET METAL ROOFING

#### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Structural standing seam metal roofing.
  - 2. Metal soffit panels.
  - 3. Underlayment.
  - 4. Eave protection.
  - 5. Metal facias, flashings, and trim.
  - 6. Metal gutters and downspouts.
  - 7. Snow guards.
- B. Related Sections:
  - 1. Section 04 20 00 Unit Masonry: Placement of flashing reglets and accessories.
  - 2. Section 05 40 00 Cold-Formed Metal Framing: Structural framing supporting metal roofing.
  - 3. Section 07 21 20 Board Insulation: Rigid insulation under sheet metal roofing system.
  - 4. Section 07 65 10 Flexible Flashing Stainless Steel.

#### 1.2 REFERENCES

- A. American Architectural Manufacturers Association:
  - 1. AAMA 2603 Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 2. AAMA 2604 Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. American Iron and Steel Institute:
  - 1. AISI General Standard for Cold-Formed Steel Framing General Provisions.
  - 2. AISI Header Standard for Cold-Formed Steel Framing Header Design.
  - 3. AISI NASPEC North American Specification for Design of Cold-Formed Steel Structural Members.
- C. American Society of Civil Engineers:
  - 1. ASCE 7 Minimum Design Loads for Buildings and Other Structures.
- D. ASTM International:
  - 1. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. ASTM A755/A755M Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
  - 3. ASTM A792/A792M Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  - 4. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 5. ASTM C1371 Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.

- 6. ASTM C1549 Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
- 7. ASTM D226 Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- 8. ASTM D1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- 9. ASTM D2178 Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
- 10. ASTM D4397 Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
- 11. ASTM D4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- 12. ASTM E283 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- 13. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- 14. ASTM E408 Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
- 15. ASTM E903 Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
- 16. ASTM E1918 Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.
- 17. ASTM E1980 Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
- E. Federal Specification Unit:
  - 1. FS TT-C-494 Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- F. National Roofing Contractors Association:
  - 1. NRCA The NRCA Roofing and Waterproofing Manual.
- G. Sheet Metal and Air Conditioning Contractors:
   1. SMACNA Architectural Sheet Metal Manual.
- H. Underwriters Laboratories Inc.:
  - 1. UL 580 Tests for Uplift Resistance of Roof Assemblies.
- I. U.S. Environmental Protection Agency:
  - 1. ENERGY STAR ENERGY STAR Voluntary Labeling Program.

# 1.3 DESIGN REQUIREMENTS

- A. Roof Loads
  - 1. Roof Live Loads: Minimum 30 psf.
  - 2. Roof Snow Loads: As calculated in accordance with applicable 2006 IBC with 35 psf ground snow load and exposure C.
  - 3. Dead Loads: Actual weight of materials incorporated into Work.
- B. Wind Loads: Design and size components to withstand positive and negative wind loads, including increased loads at building corners.
  - 1. Design Wind Load: As calculated in accordance with 90 mph basic wind speed, exposure C.
  - 2. Design Wind Load: To design pressure of 20 psf.
- C. Wind Uplift Resistance: UL 580; Class 90.
- D. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with 2006 IBC (International Building Code).

- E. Air Infiltration: Limit air leakage through roof assembly to 0.03 cfm/sq. ft of wall area, measured at reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E283.
- F. Water Leakage: None, when measured in accordance with ASTM E331 with test pressure of 6.24 psf.
- G. Gutter and Downspout Components: Conform to SMACNA Architectural Sheet Metal Manual and The NRCA Roofing and Waterproofing Manual for sizing components for rainfall intensity determined by storm occurrence of 1 in 10 years.

# 1.4 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Shop Drawings:
  - 1. Indicate metal roofing [and soffit] panel profiles, jointing patterns, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Product Data:
  - 1. Submit data on metal types, finishes, and characteristics.
  - 2. Submit color charts for finish selection.
- D. Samples:
  - 1. Submit two samples 16 x 16 inch in size illustrating metal roofing mounted on plywood backing illustrating typical seam, external corner, internal corner, valley, ridge, material, and finish.
  - 2. Submit two samples 16 x 16 inch in size illustrating metal finish color.
- E. Manufacturer's Installation Instructions: Submit instructions including special procedures for roofing penetrations, flashings, and perimeter conditions requiring special attention.
- F. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

# 1.5 QUALITY ASSURANCE

- A. Calculate structural properties of framing members in accordance with AISI NASPEC.
- B. Perform Work in accordance with SMACNA Architectural Sheet Metal Manual and The NRCA Roofing and Waterproofing Manual.

# 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum 10 years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum 5 years documented experience approved by manufacturer.
- C. Design sheet metal roofing and structural supports under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Maryland.

# 1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

# MANUFACTURED SHEET METAL ROOFING

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials causing discoloration or staining.

# 1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

# 1.10 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Coordinate with Work of Section 04 20 00 for installing recessed flashing reglets.

# 1.11 WARRANTY

- A. Section 01 77 00 Closeout Procedures: Requirements for warranties.
- B. Furnish 20-year manufacturer warranty for sheet metal roofing against structural failure, corrosion, and water penetration.
- C. Furnish 20-year manufacturer warranty for metal finish against fading, chipping, chalking, and blistering.

# PART 2 PRODUCTS

# 2.1 MANUFACTURED SHEET METAL ROOFING

# A. Manufacturers:

- 1. Fabral Model Prestige. (Basis of Design)
- 2. MBCI Model Battenlok.
- 3. Metal Fab Manufacturing, LLC Model METFAB III.
- 4. American Buildings Company Model LOC-SEAM.
- 5. Substitutions: Section 01 60 00 Product Requirements.
- B. Architectural Standing Seam Metal Roofing: Factory formed metal roofing panel system with concealed fasteners.
  - 1. Panel Materials: Pre-finished galvalume steel sheet 24-gauge base metal thickness.
  - 2. Panel Width: Nominal 16 inches.
  - 3. Panel Profile: Flat.
  - 4. Seam Type: Standing seam mechanically seamed, double locked.
  - 5. Seam Height: 2 inches.
  - 6. Color: As selected.
- C. Metal Soffit Panels: Factory formed metal soffit panel system with concealed fasteners.
  - 1. Panel Materials: Pre-finished galvanized steel sheet 24-gauge base metal thickness.
  - 2. Panel Width: Nominal 12 inches.
  - 3. Panel Profile: Flat.
  - 4. Panel Depth: Nominal 1 inches.
  - 5. Panel Joint: Interlocked.

6. Color: As selected.

# 2.2 SHEET METAL MATERIALS

- A. Pre-Finished Galvalume Steel Sheet: ASTM A755/A755M coil coated.
  - 1. Base Metal: ASTM A792/A792M; Grade 50 aluminum-zinc alloy coating.
  - 2. Exposed Finish: Minimum two coat fluoropolymer coating with minimum 70 percent polyvinylidene fluoride resin.
  - 3. Unexposed Finish: Manufacturer's standard coating.

#### 2.3 ACCESSORIES

- A. Fasteners: Galvanized steel, Stainless steel. Same material and finish as roofing.
- B. Underlayment: ASTM D226; High temperature ice and water shield.
- C. Slip Sheet: Rosin sized building paper.
- D. Ice Dam Membrane: ASTM D1970; self-adhering polymer modified bituminous sheet material, slip resistant surface, 40 mils thick, 36 inches wide, with strippable release paper to expose adhesive surface high temperature rated as manufactured by Tamco.
- E. Reglets: Recessed type, galvanized steel manufactured by Hickman.
- F. Snow Rails: Equal to Metal Roof Innovation Ltd. Color Guard S5 snow retention system.

#### 2.4 FABRICATION

- A. Form sections shape as indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Fabricate facia, trim, flashing, and other metal components from same material as metal roof panels. Provide exposed metal surfaces with same finish as exposed face of metal roof panels.
- C. Fabricate cleats of same material as sheet, to interlock with sheet.
- D. Fabricate starter strips of same material as sheet, continuous, to interlock with sheet.
- E. Form pieces in longest practical lengths.
- F. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- G. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- 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.
- J. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.
- K. Fabricate gutters to profile and size conforming to specified design requirements.

# MANUFACTURED SHEET METAL ROOFING

- L. Fabricate downspouts to rectangular size 3 x 5 diameter.
- M. Fabricate accessories in profile and size to suit gutters and downspouts.
  - 1. Anchorage Devices: In accordance with SMACNA.
    - 2. Gutter Supports: Brackets.
    - 3. Downspout Supports: Brackets.
- N. Fabricate snow guards in accordance with SMACNA Plate.

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Verification of existing conditions before starting work.
- B. Structural Framing Substrate:
  - 1. Verify primary and secondary framing members are installed and fastened, properly aligned and sloped to valley and eaves.
  - 2. Verify damaged shop coatings are repaired with touch up paint.
- C. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.
- D. Verify roofing termination and base flashings are in place, sealed, and secure.
- E. Verify insulation is installed and ready for roof application.

# 3.2 PREPARATION

- A. Wood and Metal Deck Substrate:
  - 1. Fill knot holes and surface cracks with latex filler at areas of bonded eave protection.
  - 2. Broom clean deck surfaces under eave protection and underlayment.
- B. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.

### 3.3 INSTALLATION - ICE DAM MEMBRANE

- A. Install ice dam membrane parallel with eave edge, flush with face of eave edge flashing with edges lapped shingle style and ends lapped and staggered between rows. Install high temperature ice and water shield over entire surface.
- B. Place single width eave protection sheet centered over valley, hips and ridges.
- C. Place single width eave protection sheet along gable, parallel to gable edge.

# 3.4 INSTALLATION - UNDERLAYMENT

- A. Apply underlayment over entire roof area in single layer fastened to substrate.
  - 1. Install underlayment laid perpendicular to slope.
  - 2. Weather lap edges 2 inches and nail in place.
  - 3. Stagger end joints minimum 24 inches.

# 3.5 INSTALLATION - STANDING SEAM METAL ROOFING

A. Conform to SMACNA and NRCA details.

# 3.6 INSTALLATION - SOFFIT PANELS

- A. Install perimeter trim, level and aligned perpendicular with facia.
- B. Install soffit panels to form flat, flush surface.
- C. Fit soffit panels in single length between perimeter trim. Secure panels to soffit framing substrate.
- D. Install perforated soffit panels at locations indicated on Drawings and alternating with solid panels.
- E. Adjust panels for uniform joints.

# 3.7 INSTALLATION - FLASHING

- A. Install reglets in accordance with Section 04 20 00.
- B. Conform to SMACNA and NRCA details.

# 3.8 INSTALLATION - GUTTERS AND DOWNSPOUTS

A. Conform to SMACNA and NRCA details.

# 3.9 INSTALLATION - SNOW RAILS

- A. Install snow rails in accordance with manufacturer's instructions.
- B. Install snow rails in continuous line, 12 inches up slope of exterior wall.
- C. Install one additional line of rails continue along roof edge 4'-0" from gutter.

# 3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 77 00 Closeout Procedures: Protecting installed construction.
- B. Do not permit traffic over unprotected roof surface.

# END OF SECTION

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# SECTION 07 65 10 FLEXIBLE FLASHING STAINLESS STEEL

# PART 1 - GENERAL

# 1.1 SUMMARY

- A. Laminated stainless steel fabric flashing, non-asphaltic.
- B. Related sections:
  - 1. 04 20 00 Unit Masonry.
  - 2. 05 40 00 Cold Formed Metal Framing.
  - 3. 06 11 40 Wood Blocking and Curbing.

# 1.2 REFERENCES

- A. Standards of the following as referenced:
  - 1. ASTM
  - 2. Brick Industry Association (BIA)
  - 3. Recycled content & Recyclability
- B. Industry standards:
  - 1. BIA Technical Notes on Brick Construction No. 7, Water Penetration Resistance-Design and Detailing, August 2005.
  - 2. BIA Technical Notes on Brick Construction No. 28B, Brick Veneer/Steel Stud Walls, August 2005.

# 1.3 DEFINITIONS

- A. Terms:
  - 1. Cavity wall flashing: Same as flexible flashing.
  - 2. Foundation sill flashing: Same as flexible flashing.
  - 3. Flexible flashing: Water-proof material typically used in cavity wall construction to contain and assist in the proper water drainage that may penetrate wall system veneer. Other materials may be required to constitute the system.
  - 4. Head and sill flashing: Same as flexible flashing.
  - 5. Through-wall flashing:
    - a. Generally considered the same as flexible flashing.
    - b. Rare definition referred to full width cap flashing under copings or wall caps.

# 1.4 SUBMITTALS

- A. Product data: Indicate material type, composition, thickness, and installation procedures.
- B. Samples: 3" by 5" flashing material.
- C. Product Quality & Environmental submittals:
  - 1. Certificates:
    - a. Indicate materials supplied or installed are asbestos free.
    - b. Indicate recycled content: 60% total recycled material; based on 60% Post Industrial Recycled Content.
  - 2. Performance Attributes
    - a. Tensile strength, 100,000 psi minimum average
    - b. Puncture Resistance, 2,500 pounds average
    - c. When tested as manufactured, product resists growth of mold pursuant to test method ASTM-D3273.

- d. Fire Rating: flame spread and smoke generation1. Rated Class A, ASTM E84
- e. Certify the use of domestic manufactured stainless steel for flashing.

# 1.5 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturer: Provide flashing materials by single manufacturer with not less than twentyfive years of experience in manufacturing flexible flashing products.
  - 2. Flashing materials must be able to withstand 400° F temperature without changing the long-term performance of the flashing.

# 1.6 WARRANTY

- A. Special warranty:
  - 1. Manufacturer: Warrant flexible flashing material for life of the wall.
  - 2. Begin warranty at Date of Substantial Completion.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURED UNITS

- A. Flexible flashing:
  - 1. Products of manufacturers listed below meeting indicated standards and specified manufacturer's product data characteristics, except as modified below, and are acceptable for use, subject to compliance with specified requirements.
    - a. Product standard of quality:
      - i. York Manufacturing, Inc.; Multi-Flash SS
      - ii. STS Coatings, Inc.; Gorilla Flash Stainless Fabric
      - iii. Illinois Products, Inc.; IPCO Stainless Steel Fabric Flashing
      - iv. TK Products, Inc.; TK TWF
      - v. Other products that meet the criteria in section 1.04 to 1.06.
  - 2. Characteristics:
    - a. Type: Stainless steel core with polymer fabric laminated to one stainless steel face with non-asphalt adhesive.
    - b. Stainless steel type: 304, ASTM A167.
    - c. Fabric: polymer fabric; laminated back face of stainless-steel core.
    - d. Size: Manufacturer's standard width rolls.

# 2.2 ACCESSORIES

- A. Mastic/sealant: Product standard of quality is York Manufacturing, Inc.; UniverSeal US100.
  - 1. Characteristics:
    - a. Type: One part 100% solids, solvent-free formulated silyl-terminated polyether (STPE), ASTM C920-11, Type S, Grade NS, Class 50.
- B. Outside corner and inside corner material; manufacturer's standard available units using:
  1. Stainless steel: 26-gauge stainless steel.
- C. End dam: Product may be folded in line with the flashing material or utilize preformed end dams by manufacturer using:
  - 1. Stainless steel: 26-gauge stainless steel

- D. Splice material: Product standard of quality is York304 SS by York. Manufacturer's standard self-adhered metal material; material matching system material or use Multi-Flash Stainless Steel 6" lap piece and polyether sealant as a splice.
- E. Termination bar: Product standard of quality is York T-96 termination bar. Manufacturer's standard 1" composite material bar or a 1" 26-gauge stainless steel termination bar with sealant lip.
- F. Weep vent protection: Product standard of quality is York's Weep Armor. Geotextile drainage fabric at least 12" in height.
- G. Repair and other materials/accessories: Manufacturer's standard.
- H. Fasteners: Domestic manufactured fastener types and sizes recommended by flashing manufacturer for intended use.

# PART 3 - EXECUTION

# 3.1 INSTALLATION

- A. General:
  - 1. Install where indicated, specified, or required in accord with flashing manufacturer's written instructions and as follows.
  - 2. Extend flashing 6" minimum beyond opening. Fold flashing ends at end of openings or horizontal flashing terminations to form end dam or use pre-manufactured units made of 26-gauge stainless steel.
  - 3. Flashing width: Width required starting flush with outside face of exterior wythe, extending through cavity, rising height required to extend above lintel steel at least 2".
  - 4. Splice end joints by overlapping them 6" and seal with a compatible sealant or metal splice tape.
  - 5. Masonry back up:
    - a. Surface apply after dampproofing installation specified in Dampproofing Section in accord with manufacturer's installation instructions.
    - b. Fasten to masonry back-up surface at top by embedding in layer of sealant or use a non-corrosive termination bar and fasten it to the backer wall at the top edge of the flashing and seal the top edge with compatible sealant or use a termination clamp, which is embedded in the block back up wall.
  - 6. Concrete back up:
    - a. Surface apply after dampproofing installation specified in Dampproofing Section in accord with manufacturer's installation instructions.
    - b. Fasten to concrete surface at top by embedding in layer of sealant or use a noncorrosive termination bar and fasten it to the backer wall at the top edge of the flashing and seal the top edge with a compatible sealant.
  - 7. Stud back up with sheathing:
    - a. Fasten to stud back-up at top by embedding in layer of sealant or use a non-corrosive termination bar and fasten it to the backer wall at the top edge of the flashing and seal the top edge with a compatible sealant.
  - 8. Leave ready for certified compatible building felt or air barrier installation lapping flashing top installed in another Section.
  - 9. Lay flashing in continuous bead of sealant on masonry supporting steel.
  - 10. Fold ends of flashing at end of opening to form dam; seal with polyether sealant or use purchased manufacturers preformed end dams.
  - 11. Inside and outside corners: Make in industry accepted manner using corner and splice material or purchase manufactured corners from manufacturer.

12. Cover flashing within a few days of installation to protect it from damage from the different trades, the environment and falling debris. If flashing is left unprotected and it is punctured, torn, or has loose scrim you should contact the manufacturer for repair instructions.

# 3.2 SCHEDULES

- A. Locations:
  - 1. Exterior door heads.
  - 2. Window heads and sills.
  - 3. Storefront heads.
  - 4. Horizontal control joints.
  - 5. Changes in veneer materials, vertically.
  - 6. Other wall openings.
  - 7. Other locations indicated.

# END OF SECTION

# SECTION 07 71 00 MANUFACTURED ROOF SPECIALTIES

# PART 1 GENERAL

- 1.1 WORK INCLUDED
  - A. Copings, Fascias, Fascia, Extruded Closure and Vents.
  - B. Reglets.
  - C. Gutters and Downspouts

# 1.2 RELATED WORK

A. Section 07 54 19 - Polyvinyl-Chloride PVC-TPA Roofing

# 1.3 REFERENCES

- A. ASTM D2822 Asphalt Roof Cement
- B. NRCA (National Roofing Contractors Association) Roofing and Waterproofing Manual.
- C. SMACNA Architectural Sheet Metal Manual.

# 1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- C. Product Data: Provide product data on shape of components, materials and finishes, anchor types and locations.
- D. Samples: Submit two (2) samples, 12 x 12 inches in size illustrating component shape, finish and color.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

# 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA details or as detailed within the documents.
- B. All components shall be from one manufacturing source.

# 1.6 WARRANTY

A. Copings, fascia, fascia extenders, closures and reglets shall be covered by the roofing warranty specified in Section 07 54 19.

# PART 2 PRODUCTS

# 2.1 ACCEPTABLE MANUFACTURERS

# MANUFACTURED ROOF SPECIALTIES

- A. Fabral.
- B. Atlas Roofing Corp.
- C. Pac Clad
- D. Substitutions: Under provisions of the General Conditions to the Construction Contract.
- 2.2 COMPONENTS
  - A. Fascias, Roof Edge, Fascia Extenders, Extruded Closures: Equal to Fabral flashing trim and edge metals 0.04 aluminum, shaped as indicated, with continuous cleat and splice plates. Include cover plates to conceal and weather seal joints and attachment flanges. Provide extruded closure plates as required and mitered, welded corners. Color shall be pre-finished Kynar 20-year finish as selected by the Architect from the manufacturer's full Kynar color range.
  - B. Reglets: shall be equal to Hickman's In-wall Drive Lock and Concealed Mount Reglets with counterflashing fabricated from stainless steel. Provide factory fabricated corners and wind clips. Counterflashing shall be 5 3/4" long. Color shall be pre-finished Kynar coating as selected by the Architect.
  - C. Gutters and Downspouts: Formed 22 ga. minimum, 4" x 4" gutter, 3" x 4" downspout. See drawings for profile.

# 2.3 ACCESSORIES

- A. Sealant: Roofing Manufacturer's standard type suitable for use with installation of system; nonstaining, skinning, non-skinning, non-shrinking and non-sagging; ultra-violet and ozone resistant; color as selected.
- 2.4 FINISHES
  - A. Provide color as selected by the Architect from the full range of Kynar formulations with 20-year manufacturer's limited warranty.

# PART 3 EXECUTION

- 3.1 INSPECTION
  - A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.
- 3.2 INSTALLATION
  - A. Install components in accordance with manufacturer's instructions.
  - B. Conform to NRCA Waterproofing Manual drawing details.
  - C. Coordinate installation of components of the section with installation of roofing membrane and base flashings.
  - D. Coordinate installation of flashing flanges into reglets.

# END OF SECTION

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### SECTION 07 90 00 JOINT PROTECTION

# PART 1 GENERAL

### 1.1 SECTION INCLUDES

- A. Preparing substrate surfaces.
- B. Sealant and joint backing.
- C. Security Sealants (Detention Areas).

#### 1.2 RELATED SECTIONS

- A. Section 03 30 00 Cast-in-Place Concrete: Sealants required in conjunction with cast-in-place concrete.
- B. Section 04 20 00 Unit Masonry: Sealants required in conjunction with masonry.
- C. Section 08 11 00 Steel Doors and Frames: Sealants required in conjunction with door frames.
- D. Section 08 41 00 Aluminum Frames Storefronts.
- E. Section 08 44 13 Glazed Aluminum Curtain Walls.
- F. Section 09 26 00 Gypsum Board Systems.
- G. Section 09 30 00 Tiling: Sealants required in conjunction with floor and base finish.

#### 1.3 REFERENCES

- A. ASTM C790 Use of Latex Sealing Compounds.
- B. ASTM C804 Use of Solvent-Release Type Sealants.
- C. ASTM C834 Latex Sealing Compounds.
- D. ASTM C919 Use of Sealants in Acoustical Applications.
- E. ASTM C920 Elastomeric Joint Sealants.
- F. ASTM D1056 Flexible Cellular Materials Sponge or Expanded Rubber.
- G. ASTM D1565 Flexible Cellular Materials Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).
- H. SWRI (Sealant, Waterproofing and Restoration Institute) Sealant and Caulking Guide Specification.

# 1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

#### JOINT PROTECTION

- 1. Written certification from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated as verified through manufacturers in-house testing laboratory.
- C. Samples: Submit two samples, 1 x 4 inch in size illustrating sealant colors for selection.
- D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

#### 1.5 QUALITY ASSURANCE

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

#### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by manufacturer.

### 1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

# 1.8 COORDINATION

- A. Coordinate work with other trades.
- B. Coordinate the work with all sections referencing this section.
- 1.9 DELIVERY, STORAGE AND HANDLING
  - A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
  - B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high and low temperatures, contaminants or other causes.

#### 1.10 WARRANTY

A. Special Installer Warranty: Submit a written, labor and material warranty agreeing to repair or replace sealants which fail to provide airtight and/or watertight joints, or fail in adhesion, cohesion abrasion-resistance, stain-resistance, weather resistance, or general durability or appear to deteriorate in any other manner not clearly specified in the manufacturer

#### PART 2 PRODUCTS

# 2.1 APPROVED MANUFACTURERS

- A. Pecora
- B. Tremco

- C. Bostik
- D. Sika
- Substitutions shall be submitted in accordance with General Conditions to the Construction E. Contract.
- **SEALANTS** 2.2
  - Polyurethane Traffic Grade Sealant (Type A): ASTM C920, Two Part, chemical curing, non-A. staining, non-bleeding, capable of continuous water immersion, self-leveling type; color as selected; Urexpan NR-200 manufactured by Pecora.

25 percent

20 to 35

- 1. Elongation Capability
- 2. Service Temperature Range
- 3. Shore A Hardness Range
- Polyurethane Sealant (Type B): ASTM C920, Grade NS, Class A, chemical curing, non-staining, Β. non-bleeding, capable of continuous water immersion, non-sagging type; color as selected; Dynatrol II manufactured by Pecora.
  - 1. Elongation Capability
  - 2. Service Temperature Range
  - 3. Shore A Hardness Range

50 percent -20 to 180 degrees F 20 to 35

-40 to 180 degrees F

- Silicone Sealant (Type C): ASTM C920, Grade NS, Class 25, Use NT; single component, fungus C. resistant, chemical curing, non-sagging, non-staining, non-bleeding; color as selected; 860 manufactured by Pecora.
  - 1. Elongation Capability
  - 2. Service Temperature Range
  - 3. Shore A Hardness Range

25 percent -75 to +400 degrees F 15 to 50

D. Elastomeric Polyurethane Sealant (Type D): Two component, chemical curing, non-staining, nonbleeding, capable of continuous water immersion, non-sagging, self-leveling type; color as selected; manufactured by Pecora-Dynaflex:

1.	Elongation Capability	175-200 percent
2.	Service Temperature Range	-40 to 180 degrees F
3.	Shore A Hardness Range	55
4.	Tensile Strength	375-40 psi

Elastomeric Silicone Sealant (Type E): One-part, low modulus neutral-coring, high performance E. silicone sealant curing via atmospheric moisture to form a durable flexible seal; color as selected; manufactured by Pecora

25

1. Pecora 864

С

- a. **Elongation Capability**
- Service Temperature Range b.
- Shore A Hardness Range C.
- Pecora 890 FTS 2.
  - **Elongation Capability** a.
  - Service Temperature Range b.

Shore A Hardness Range

-60 to +300 degrees F 20

-60 to +300 degrees F

900 percent

1.00 percent

- 3. STI Spec Seal ES, Fire-rated Joint Sealant Where required.

#### 2.3 ACCESSORIES

Primer: Non-staining type, recommended by sealant manufacturer to suit application. A.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backings: Provide sealant backings of material and type that are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing. Select shape and size of joint filler in consultation with the manufacturer for proper performance in the specified condition of use in each case.

- 1. Joint Backing: ASTM D1565; round, open cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.
- 2. Joint Backing (For use with Type E Sealant): One of the following preformed, compressible, resilient, non-staining, non-waxing, non-extruding strips of flexible plastic foam for material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance, on the following:
  - a. HBR Backer Rod; Applied Extrusion Technologies
  - b. Soneborn Sonofoam Closed Cell Backer Road; ChemRex, Inc.
  - c. Expand-o-Foam; Williams Products, Inc.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

# PART 3 EXECUTION

# 3.1 EXAMINATION

- A. Verify that substrate surfaces and joint openings are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

#### 3.2 PREPARATION

- A. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions.
- D. Protect elements surrounding the work of this section from damage or disfiguration.

### 3.3 INSTALLATION

- A. Install sealant in accordance with manufacturer's instructions.
- B. Measure joint dimensions and size materials to achieve required 2:1 width/depth ratios.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 of the 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.

# 3.4 CLEANING

- A. Clean work under provisions of 01 77 00.
- B. Clean adjacent soiled surfaces.

#### 3.5 PROTECTION OF FINISHED WORK

- A. Protect finished installation under provisions of Section 01 50 00.
- B. Protect sealants until cured.

# 3.6 SCHEDULE

**General:** The following sealants shall be installed throughout the construction where construction materials intersect or abut creating a joint which requires closure for appearance, weather, or as may be required by the Owner and Architect.

	Location	Туре
A.	Exterior horizontal concrete paving & Type II sidewalk expansion joints (Type A)	Two-part polyurethane Traffic Grade
B.	Exterior vertical joints (Type B)	Two-part polyurethane Type II
C.	Interior vertical & horizontal joints Type II (Type B)	Two-part polyurethane
D.	Interior wet areas, kitchen, & toilet silicone fixtures joints w/fungicide (Type C)	High modulus
E.	Detention Areas (Type D)	Elastomeric polyurethane sealant
F.	Parking Garage	One Part, Low Modulus, High- Performance Silicone Sealant

END OF SECTION

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# SECTION 08 06 71

### DOOR HARDWARE SETS

#### PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section references specification sections relating to commercial door hardware for the following:
  - 1. Swinging doors.
  - 2. Sliding Doors.
  - 3. Other doors to the extent indicated.
- B. Commercial door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Electromechanical and access control door hardware.
  - 3. Cylinders specified for doors in other sections.
- C. Related Sections:
  - 1. Section 08 11 13 Hollow Metal Doors and Frames
  - 2. Section 08 21 00 Flush Wood Doors
  - 3. Section 08 41 00 Aluminum Framed Storefronts
  - 4. Section 08 71 00 Door Hardware
  - 5. Section 28 13 00 Access Control
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC International Building Code.
  - 3. NFPA 70 National Electrical Code.
  - 4. NFPA 80 Fire Doors and Windows.
  - 5. NFPA 101 Life Safety Code.
  - 6. NFPA 105 Installation of Smoke Door Assemblies.
  - 7. State Building Codes, Local Amendments.
- E. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

# 1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door

Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

- 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
- 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
- 3. Content: Include the following information:
  - a. Type, style, function, size, label, hand, and finish of each door hardware item.
  - b. Manufacturer of each item.
  - c. Fastenings and other pertinent information.
  - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
  - e. Explanation of abbreviations, symbols, and codes contained in schedule.
  - f. Mounting locations for door hardware.
  - g. Door and frame sizes and materials.
- 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.
- D. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.
- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

# 1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum [5] years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum [3] years documented experience installing both standard and electrified builders' hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum [5] years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor in good standing by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- D. Source Limitations: Obtain each type and variety of Door Hardware specified in the Related Sections from a single source, qualified supplier unless otherwise indicated.
- E. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the applicable model building code.
- F. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

# 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

# 1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Division 08 Sections (Steel, Aluminum and Wood) doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

# 1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

#### 1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

#### PART 2 - PRODUCTS

#### 2.1 SCHEDULED DOOR HARDWARE

A. Refer to "PART 3 – EXECUTION" for required specification sections.

#### PART 3 - EXECUTION

#### 3.1 DOOR HARDWARE SETS

- A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.
- C. Products listed in the Door Hardware Sets must meet the requirements described in the specification sections noted.
  - 1. Section 08 71 00 Door Hardware.
  - 2. Section 28 13 00 Access Control.

#### Set: 1 – Overhead Roll-up Door

Doors: 101D, 101E

All hardware furnished by door manufacturer

#### Set: 2 – Holding Room

Doors: 107A

3	Hinge	T4A3786 5" x 4-1/2" NRP	US26D	MK
1	Electric Hinge	T4A3786 5" x 4-1/2" QC-12	US26D	MK
	(Install at second form bottom hinge)			
1	ElectroLynx Harness	QC-C1500P		MK
	(Install between electric hinge and junction	on box)		
1	Electrified Exit Device (Fail Secure)	ED5200 x 1259905ET x PHS x M51	630	RU
		x M92 x M110 x W048 x MK		
1	ElectroLynx Harness	QC-CXXX x required length		MK
	(Install between alectric himes and alectri	if a d avit davias)		

(Install between electric hinge and electrified exit device)

08 06 71 - 4

#### DOOR HARDWARE SETS

#### TERMINAL BUILDING EXPANSION HAGERSTOWN REGIONAL AIRPORT – RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN)

1	Closer/Stop	DC6210 A11 x M77	689	RU
1	Mounting Plate	597F58	689	RU
1	Threshold	170 A x DOW x MS & ES25		PE
1	Door Bottom Seal	321 CN x DOW		PE
2	Card Reader	Furnished and installed by security contra	actor	OT
1	Door Position Switch	DPS-M-BK		SU
1	Power Supply	AQD3-1R		SU
1	Wiring Diagram	WD-SYSPK		RU

Pull side card reader to be used by authorized persons to gain entry from the pull side of the opening Pull side card reader to be used to unlock the pull side lever of the electrified exit device Push side card reader to be used by authorized persons to exit from the push side of the opening

Push side card reader to be used by authorized persons to exit from the push side of the opening Push side card reader to be used to deactivate the alarm

Depressing the push bar of the electrified exit device without use of the push side card reader will activate the alarm

Push bar of the electrified exit device always free for immediate egress

# Set: 3 – Security Gate

Doors: 122A, 122C, 124

1 Cylinder	"As required" x PHS x MK	626	RU
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Balance of hardware furnished by door gate manufacturer

# <u>Set: 4 – Exterior Holding Room</u>

Doors: 123

1	Continuous Hinge	MCK-12HD x 84"	Clear	MK
1	Power Transfer	EL-CEPT		SU
1	ElectroLynx Harness	QC-C1500P		MK
	(Install between power transfer and junct	ion box)		
1	Electrified Exit Device (Fail Secure)	ED5200 x 1259905ET x PHS x M51	630C	RU
		x M92 x M110 x W048 x MK		
1	ElectroLynx Harness	QC-CXXX x required length		MK
	(Install between power transfer and electric	rified exit device)		
1	Closer	DC8200	689	RU
1	Wall Stop	406	US32D	RO
1	Threshold	170 A x DOW x MS & ES25		PE
1	Door Bottom Seal	345 AV x DOW		PE
1	Drip Strip	346 C x DOW + 4"		PE
2	Card Reader	Furnished and installed by security contra	ctor	OT
1	Door Position Switch	DPS-M-BK		SU
1	Power Supply	AQD3-1R		SU
1	Wiring Diagram	WD-SYSPK		RU

Gasketing furnished by frame manufacturer

Pull side card reader to be used by authorized persons to gain entry from the pull side of the opening Pull side card reader to be used to unlock the pull side lever of the electrified exit device

Exterior side card reader to be used by authorized persons to exit from the exterior side of the opening Exterior side card reader to be used to deactivate the alarm

Depressing the push bar of the electrified exit device without use of the exterior side card reader will activate the alarm

Push bar of the electrified exit device always free for immediate egress

# Set: 5 - Holding Room

#### Doors: 124A

3 Hinge	T4A3786 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lockset	ML2055 125U x PHS x MK	626	RU
1 Closer/Holder	DC6200 A1	689	RU
1 Kickplate	K1050 10" x 2" LDW 4BE CSK	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO

#### <u>Set: 6</u> – Exterior Holding Room

Doors: 124B

1	Continuous Hinge	MCK-12HD x 95"	Clear	MK
1	Power Transfer	EL-CEPT		SU
1	ElectroLynx Harness	QC-C1500P		MK
	(Install between power transfer and junc	tion box)		
1	Electrified Exit Device (Fail Secure)	ED5200 x 1259905ET x PHS x M51	630C	RU
		x M92 x M110 x W048 x MK		
1	ElectroLynx Harness	QC-CXXX x required length		MK
	(Install between power transfer and elec	trified exit device)		
1	Closer	DC8210 A3 x M77	689	RU
1	Mounting Plate	754F25	689	RU
1	Overhead Stop	1-X36 x 90 deg	652	RF
1	Threshold	170 A x DOW x MS & ES25		PE
1	Door Bottom Seal	345 AV x DOW		PE
1	Drip Strip	346 C x DOW + 4"		PE
2	Card Reader	Furnished and installed by security cont	tractor	OT
1	Door Position Switch	DPS-M-BK		SU
1	Power Supply	AQD3-1R		SU
1	Wiring Diagram	WD-SYSPK		RU

Gasketing furnished by frame manufacturer

Exterior side card reader to be used by authorized persons to gain entry from the exterior side of the opening

Exterior side card reader to be used to unlock the exterior side lever of the electrified exit device Push side card reader to be used by authorized persons to exit from the push side of the opening Push side card reader to be used to deactivate the alarm

Depressing the push bar of the electrified exit device without use of the push side card reader will activate the alarm

Push bar of the electrified exit device always free for immediate egress

# <u>Set: 7 – Group Toilet</u>

Doors: 125, 126

4	Hinge	T4A3786 4-1/2" x 4-1/2"	US26D	MK
1	Push Plate	70C 4 x 16	US32D	RO
1	Pull Plate	110 x 70C 4 x 16	US32D	RO
1	Closer	DC5230	689	RU
1	Kickplate	K1050 10" x 2" LDW 4BE CSK	US32D	RO
1	Mop Plate	K1050 4" x 1" LDW 4BE CSK	US32D	RO
1	Wall Stop	406	US32D	RO
3	Silencer	608		RO

#### Set: 8 - Custodian

Doors: 126A

4 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom Lockset	ML2057 125U x PHS x MK	626	RU
1 Kickplate	K1050 10" x 2" LDW 4BE CSK	US32D	RO
1 Mop Plate	K1050 4" x 1" LDW 4BE CSK	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO

# Set: 9 – Café

Doors: 127

4 Hinge	T4A3786 5" x 4-1/2" NRP	US26D	MK
1 Storeroom Lockset	ML2057 125U x PHS x MK	626	RU
1 Closer/Stop	DC6210 A11	689	RU
1 Kickplate	K1050 10" x 2" LDW 4BE CSK	US32D	RO
1 Mop Plate	K1050 4" x 1" LDW 4BE CSK	US32D	RO
3 Silencer	608		RO

#### Set: 10 – Office

Doors: 128, 133

3 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Office Lockset	ML2051 125U x PHS x MK	626	RU
1 Kickplate	K1050 10" x 2" LDW 4BE CSK	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO

# Set: 11 – Conference Room

Doors: 129

4 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lockset	ML2055 125U x PHS x MK	626	RU
1 Kickplate	K1050 10" x 2" LDW 4BE CSK	US32D	RO

DOOR HARDWARE SETS

1 Wall Stop	406	US32D	RO
3 Silencer	608		RO

# <u>Set: 12 – Utility</u>

Doors: 130

TA2714 4-1/2" x 4-1/2"	US26D	MK
TA2714 4-1/2" x 4-1/2" PoE	US26D	MK
PoE-C1500P		MK
on box)		
MG-16	US2C	MK
IN220-ML20234 125U x PHS x IPS	626	RU
x MB x MK (Refer to Section 281300)		
PoE-CXXX x required length		MK
s control lockset)		
DC6200	689	RU
K1050 10" x 2" LDW 4BE CSK	US32D	RO
406	US32D	RO
608		RO
WD-SYSPK		RU
	TA2714 4-1/2" x 4-1/2" TA2714 4-1/2" x 4-1/2" PoE PoE-C1500P on box) MG-16 IN220-ML20234 125U x PHS x IPS x MB x MK (Refer to Section 281300) PoE-CXXX x required length c control lockset) DC6200 K1050 10" x 2" LDW 4BE CSK 406 608 WD-SYSPK	TA2714 4-1/2" x 4-1/2"       US26D         TA2714 4-1/2" x 4-1/2" PoE       US26D         PoE-C1500P       US2C         m box)       US2C         MG-16       US2C         IN220-ML20234 125U x PHS x IPS       626         x MB x MK (Refer to Section 281300)       PoE-CXXX x required length         control lockset)       DC6200       689         K1050 10" x 2" LDW 4BE CSK       US32D         406       US32D         608       WD-SYSPK

Door mounted reader to be used by authorized persons to gain entry from the push side of the opening Door mounted reader to be used to unlock the push side lever of the access control lockset Pull side lever of the access control lockset always free for immediate egress

# Set: 13 – Storage

#### Doors: 131

4 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom Lockset	ML2057 125U x PHS x MK	626	RU
1 Closer	DC6200	689	RU
1 Kickplate	K1050 10" x 2" LDW 4BE CSK	US32D	RO
1 Wall Stop	406	US32D	RO
1 Gasketing (Set)	S88 BL x DOW x DOH		PE

# Set: 14 – Office

# Doors: 134

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Electric Hinge	TA2714 4-1/2" x 4-1/2" PoE	US26D	MK
	(Install at second from bottom hinge)			
1	ElectroLynx Harness	PoE-C1500P		MK
	(Install between electric hinge and junction	on box)		
1	Mortar Box	MG-16	US2C	MK
1	Access Control Lockset	IN220-ML20234 125U x PHS x IPS	626	RU
		x MB x MK (Refer to Section 281300)		
1	ElectroLynx Harness	PoE-CXXX x required length		MK

(Install between electric hinge and access control lockset)

#### TERMINAL BUILDING EXPANSION HAGERSTOWN REGIONAL AIRPORT – RICHARD A. HENSON FIELD AIP 3-24-0019-059-2018 (DESIGN); MAA-GR-19-009 (DESIGN)

1 Closer/Holder	DC6200 A1	689	RU
1 Kickplate	K1050 10" x 2" LDW 4BE CSK	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO
1 Wiring Diagram	WD-SYSPK		RU

Door mounted reader to be used by authorized persons to gain entry from the push side of the opening Door mounted reader to be used to unlock the push side lever of the access control lockset Pull side lever of the access control lockset always free for immediate egress

# Set: 15 – Exterior Corridor

#### Doors: 138

1	Continuous Hinge	MCK-12HD x 83"	Clear	MK
1	Exit Device	ED5200 x K157ET x PHS x M51 x M110 x MK	630	RU
1	Pull	RM201 x Type 12HD mounting	US32D	RO
1	Closer	DC8210 A3 x M77	689	RU
1	Mounting Plate	754F25	689	RU
1	Overhead Stop	1-X36 x 90 deg	652	RF
1	Threshold	170 A x DOW x MS & ES25		PE
1	Door Bottom Seal	345 AV x DOW		PE
1	Drip Strip	346 C x DOW + 4"		PE
1	Door Position Switch	DPS-M-BK		SU

Gasketing furnished by frame manufacturer

#### Set: 16 – Vestibule

Doors: 143A

4 Hinge	T4A3786 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom Lockset	ML2057 125U x PHS x MK	626	RU
1 Closer	DC6200	689	RU
1 Wall Stop	406	US32D	RO

# Set: 17 – Existing Door

Doors: E101A, E115, E137A			
1 Access Control Lockset	IN120-ML20134 125U x PHS x IPS x MB x MK (Refer to Section 281300)	626	RU

Existing door and frame to remain

Balance of hardware existing to remain

Door mounted reader to be used by authorized persons to gain entry from the push side of the opening Door mounted reader to be used to unlock the push side lever of the access control lockset

Pull side lever of the access control lockset always free for immediate egress

The general contractor shall verify that all new hardware will work with existing door and frame conditions

# <u>Set: 18 – Existing Door</u>

#### Doors: E117B, E118A, E119A, E120A, E121A, E143B

1	Electric Strike	1500C x 2004 x 24VDC	630	HS
1	ElectroLynx Harness	QC-C1500P		MK
	(Install between electric strike and junction	on box)		
1	Card Reader	Furnished and installed by security contr	actor	OT
1	Door Position Switch	DPS-W-BK		SU
1	Power Supply	AQD3-1R		SU
1	Wiring Diagram	WD-SYSPK		RU

Existing door and frame to remain

Balance of hardware existing to remain

Card reader to be used by authorized persons to gain entry from the push side of the opening Card reader to be used to activate the electric strike

The general contractor shall verify that all new hardware will work with existing door and frame conditions

#### Set: MISC – Miscellaneous

Doors:

1 Lock Configuration Tool	WFCD1 (Refer to Section 281300)	RU
1 Lock Management Tool	WFCD1 (Refer to Section 281300)	RU
1 Credential (Lot)	50 each (Refer to Section 281300)	RU

END OF SECTION

#### SECTION 08 11 00 STEEL DOORS AND FRAMES

#### PART 1 GENERAL

#### 1.1 SUMMARY

A. Section includes steel doors, panels and frames; non-rated and fire rated, and interior borrowed light frames.

# 1.2 RELATED SECTIONS

- A. Section 08 21 00 Flush Wood Doors
- B. Section 08 71 00 Door Hardware
- C. Section 08 80 00 Glazing
- D. Section 09 90 00 Painting

#### 1.3 SUBMITTALS

- A. Shop Drawings: Indicate door and frame elevations, internal reinforcement, cut-outs for glazing, louvers, jamb and door selections and finishes.
- B. Product Data: Submit door and frame configurations, location of cut-outs for hardware reinforcement.

### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
  - 1. ANSI 250.8 Recommended Specifications for Standard Steel Doors and Frames.
  - 2. DHI Door Hardware Institute The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- B. Fire Rated Door and Panel Construction: Conform to NFPA 252.
- C. Fire Rated Stair Doors: Rate of rise of 450 degrees F across door thickness.
- D. Installed Fire Rated Door and Panel Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.
- E. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.
  - 1. Indicate temperature rise rating for stair doors.
- F. Surface Burning Characteristics:
  - 1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84 and NFPA 255.
- G. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation material.

# PART 2 PRODUCTS

#### 2.1 STEEL DOORS AND FRAMES

- A. Manufacturers:
  - 1. Amweld Building Products, Inc.
  - 2. Ceco Door Products.
  - 3. Pioneer Industries.
  - 4. Republic Builders Products.
  - 5. Steelcraft.
  - 6. Curries.
  - 7. Substitutions: Permitted in accordance with Section 01 60 00.
- B. Product Description: Standard shop fabricated steel doors, door panels, and frames; fire rated and non-rated types; flush face or stile and rail design, and door louvers.

#### 2.2 COMPONENTS

- A. Exterior Doors (Insulated): SDI 108, 1-3/4 inch thick.
  1. Level 3 Extra heavy Duty, Model 2, seamless design. galvanized.
- B. Interior Doors (Non-Rated): SDI 108, 1-3/4 inch thick.
  1. Level 3 Extra heavy Duty, Model 2, seamless design.
- C. Interior Doors (Fire Rated): SD I 108, 1-3/4 inch thick.
  1. Level 3 Extra heavy Duty, Model 2, seamless design.
- D. Exterior Frames:
  - 1. Level 3 for Door Models 2 nominal 16 gage/0.053-inch-thick material, base metal thickness. galvanized
- E. Interior Frames:
  - 1. Level 3 for Door Models 2, nominal 16 gage/0.053-inch-thick material, base metal thickness.
- F. Door Core: Polystyrene foam and steel channel grid.
- G. End Closure: Channel, 0.04 inch thick, inverted.
- H. Thermal Insulated Door: Total insulation R-Value of 4, measured in accordance with ASTM C1363.
- I. Sound Rated Door: STC of 32, measured in accordance with ASTM E413.

#### 2.3 ACCESSORIES

- A. Door Louvers: Roll formed material; Inverted Y blade, sight proof; prime painted.
- B. Silencers: Resilient vinyl fitted into drilled hole.
- C. Removable Stops: Rolled steel channel shape.
- D. Astragals for Double Doors: Steel, T shaped, specifically for double doors.
- E. Bituminous Coating: Fibered asphalt emulsion.

- F. Primer: ANSI A250.10 rust inhibitive type.
- G. Weather-stripping: Specified in Section 08 71 00.

### 2.4 FABRICATION

- A. Fabricate doors and frames with hardware reinforcement welded in place. Protect frame hardware preparations with mortar guard boxes.
- B. Attach astragal to one leaf of pairs of doors.
- C. Fabricate frames as face welded units.
- D. Fabricate frames to suit masonry wall coursing with head member as detailed.
- E. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
- F. Prepare interior frames for silencers and install.
- G. Frame Mullions for Double Doors: Removable type, with profile matching jambs.
- H. Frame Transom Bars: Fixed type, with profile matching jamb and head.
- I. Attach fire rating label to each fire rated door and frame.

# 2.5 SHOP FINISHING

- A. Steel Sheet: Galvanized to ASTM A653/A653M A60.
- B. Primer: Baked.
- C. Coat inside of frame profile with bituminous coating.

#### PART 3 EXECUTION

- 3.1 EXAMINATION
  - A. Verify opening sizes and tolerances are acceptable.

# 3.2 INSTALLATION

- A. Install doors and frames in accordance with ANSI A250.8.
- B. Coordinate installation of doors and frames with installation of hardware specified in Section 08 71 00.
- C. Coordinate door frames with masonry, gypsum board wall construction for frame anchor placement.
- D. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.
- E. Install door louvers plumb and level.

#### STEEL DOORS AND FRAMES

- F. Coordinate installation of glass and glazing specified in Section 08 80 00.
- G. Adjust door for smooth and balanced door movement.
- H. Tolerances:
  - 1. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

### END OF SECTION

# SECTION 08 11 13

### HOLLOW METAL DOORS AND FRAMES

# PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

#### A. Section Includes:

- 1. Standard and custom hollow metal doors and frames.
- 2. Steel sidelight, borrowed lite and transom frames.
- B. Related Sections:
  - 1. Section 04 20 00 Unit Masonry for embedding anchors for hollow metal work into masonry construction.
  - 2. Section 08 21 00 Flush Wood Doors
  - 3. Section 08 71 00 Door Hardware
  - 4. Section 08 80 00 Glazing for glass view panels in hollow metal doors.
  - 5. Section 09 90 00 Painting for field painting hollow metal doors and frames.
  - 6. Section 28 13 00 Access Control for access control devices installed at door openings and provided as part of a security access control system.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI/SDI A250.8 Recommended Specifications for Standard Steel Doors and Frames.
  - 2. ANSI/SDI A250.4 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
  - 3. ANSI/SDI A250.6 Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
  - 4. ANSI/SDI A250.10 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
  - 5. ANSI/SDI A250.11 Recommended Erection Instructions for Steel Frames.
  - 6. ASTM A1008 Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
  - 7. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 8. ASTM A924 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - 9. ASTM C 1363 Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
  - 10. ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Frames.
  - 11. ANSI/SDI 122 Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
  - 12. ANSI/NFPA 80 Standard for Fire Doors and Fire Windows; National Fire Protection Association.
  - 13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.

#### HOLLOW METAL DOORS AND FRAMES

- 14. NFPA 252 Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
- 15. UL 10C Positive Pressure Fire Tests of Door Assemblies.
- 16. UL 1784 Standard for Air Leakage Tests of Door Assemblies.

# 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Shop Drawings: Include the following:
  - 1. Elevations of each door design.
  - 2. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 3. Locations of reinforcement and preparations for hardware.
  - 4. Details of anchorages, joints, field splices, and connections.
  - 5. Details of accessories.
  - 6. Details of moldings, removable stops, and glazing.
  - 7. Details of conduit and preparations for power, signal, and control systems.
- D. Samples for Verification:
  - 1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

# 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.
  - 1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
  - 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
  - 3. Smoke Control Door Assemblies: Comply with NFPA 105.
    - a. Smoke "S" Label: Doors to bear "S" label and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

# 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
  - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

### 1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

#### 1.7 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

#### 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective frames.

# PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
  - 1. CECO Door Products (CE).

#### HOLLOW METAL DOORS AND FRAMES

- 2. Curries Company (CU).
- 3. Pioneer Industries (PI).

# 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

# 2.3 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
  - 1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
  - 2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
  - 3. Manufacturers Basis of Design:
    - a. Curries Company (CU) M Series.
- C. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

# 2.4 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042-inch-thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  - 2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

# 2.5 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

#### HOLLOW METAL DOORS AND FRAMES

#### 2.6 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

#### 2.7 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Frames:
  - 1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
    - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
  - 3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  - 4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
  - 5. Continuous Hinge Reinforcement: Provide welded continuous 12-gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
  - 6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
  - 7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
  - 8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  - 9. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.
      - 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.

- 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
- 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
- 10. Door Silencers: Except on weather-stripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
- D. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
  - 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  - 2. Reinforce frames to receive non-template, mortised and surface mounted door hardware.
  - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

# 2.8 STEEL FINISHES

- A. Prime Finishes: Frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
  - 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

# PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

#### HOLLOW METAL DOORS AND FRAMES

D. Drill and tap frames to receive non-template, mortised, and surface-mounted door hardware.

### 3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
  - 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
  - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
  - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
  - 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

### 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

# END OF SECTION

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#### SECTION 08 21 00 FLUSH WOOD DOORS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Solid-core doors and transom panels with wood-veneer faces.
  - 2. Factory finishing flush wood doors.
  - 3. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Sections:
  - 1. Section 08 80 00 Glazing for glass view panels in flush wood doors.
  - 2. Section 09 90 00 Painting for field finishing doors.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
  - 1. Indicate dimensions and locations of mortises and holes for hardware.
  - 2. Indicate dimensions and locations of cutouts.
  - 3. Indicate requirements for veneer matching.
  - 4. Indicate doors to be factory finished and finish requirements.
  - 5. Indicate fire-protection ratings for fire-rated doors.
- C. Samples for Initial Selection: For factory-finished doors.
- D. Warranty: Sample of special warranty.

# 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors from single manufacturer.
- B. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
  - 1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  - 1. Temperature-Rise Limit: Where indicated, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
- D. Preinstallation Conference: Conduct conference at Project site.
- 1.4 DELIVERY, STORAGE, AND HANDLING
  - A. Comply with requirements of referenced standard and manufacturer's written instructions.

#### **FLUSH WOOD DOORS**

- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

#### 1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

#### 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Algoma Hardwoods, Inc.
  - 2. Eggers Industries.
  - 3. Mohawk Flush Doors, Inc.; a Masonite company.

#### 2.2 DOOR CONSTRUCTION, GENERAL

- A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
- B. WDMA I.S.1-A Performance Grade: Heavy Duty.
- C. WDMA I.S.1-A Performance Grade: 1. Heavy Duty unless otherwise indicated.
- D. Particleboard-Core Doors:
  - 1. Particleboard: ANSI A208.1, Grade LD-1, made with binder containing no ureaformaldehyde resin.
  - 2. Blocking: Provide wood blocking in particleboard-core doors as follows:
    - a. 5-inch top-rail blocking, in doors indicated to have closers.
      - b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
      - c. 5-inch midrail blocking, in doors indicated to have exit devices.
  - 3. Provide doors with either glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- E. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fireprotection rating indicated.

- 1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
- F. Mineral-Core Doors:
  - 1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
  - 2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as follows:
    - a. 5-inch top-rail blocking.
    - b. 5-inch bottom-rail blocking, in doors indicated to have protection plates.
    - c. 5-inch midrail blocking, in doors indicated to have armor plates.
    - d. 4-1/2-by-10-inch lock blocks and 5-inch midrail blocking, in doors indicated to have exit devices.
  - 3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

# 2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors:
  - 1. Grade: Premium, with Grade AA faces.
  - 2. Species: Red oak.
  - 3. Cut: Plain sliced.
  - 4. Match between Veneer Leaves: Book match.
  - 5. Assembly of Veneer Leaves on Door Faces: Center-balance match.
  - 6. Pair and Set Match: Provide for doors hung in same opening.
  - 7. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
  - 8. Transom Match: Continuous match.
  - 9. Exposed Vertical Edges: Same species as faces or a compatible species] [Same species as faces.
  - 10. Core: Particleboard.
  - 11. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering.
  - 12. Construction: Seven plies, either bonded or nonbonded construction.
  - 13. WDMA I.S.1-A Performance Grade: Heavy Duty.

# 2.4 LOUVERS AND LIGHT FRAMES

- A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads as follows unless otherwise indicated.
  - 1. Wood Species: Same species as door faces.
  - 2. Profile: Flush rectangular beads.
  - 3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
- B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard woodveneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.
- C. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- thick, cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated.

#### 2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  - 1. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
  - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
  - 2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
  - 1. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- D. Openings: Cut and trim openings through doors in factory.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 Glazing.
  - 3. Louvers: Factory install louvers in prepared openings.

# 2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Finish doors at factory.
- C. Finish doors at factory that are indicated to receive transparent finish.
- D. Transparent Finish:
  - 1. Grade: Custom.
  - 2. Finish: AWI conversion varnish system.
  - 3. Staining: As selected by Architect from manufacturer's full range.
  - 4. Effect: Open-grain finish.
  - 5. Sheen: Satin.

# PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
  - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Hardware: For installation, see Section 08 71 00 Door Hardware.
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
  1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

# 3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

# END OF SECTION

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#### SECTION 08 31 00 ACCESS DOORS AND PANELS

#### PART 1 GENERAL

### 1.1 SUMMARY

- A. Section includes fire resistive rated and non-rated access doors and panels with frames.
  - 1. Provide for access to controls, valves, traps, dampers, cleanouts, and similar items requiring operation behind inaccessible finished surfaces.
  - 2. Coordinate exact locations with various trades to assure proper placement of access doors and panels.
- B. Related Sections:
  - 1. Section 09 90 00 Painting: Field paint finish.
  - 2. Division 23 Heating, Ventilating and Air Conditioning (HVAC).

#### 1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. Intertek Testing Services (Warnock Hersey Listed):
   1. WH Certification Listings.
- C. National Fire Protection Association:
  1. NFPA 80 Standard for Fire Doors, Fire Windows.
- D. Underwriters Laboratories Inc.:1. UL Building Materials Directory.

#### 1.3 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate exact position of access door units.
- C. Product Data: Submit literature indicating sizes, types, finishes, hardware, scheduled locations, fire resistance listings, and details of adjoining Work.
- D. Samples: Submit two 12 x 12 inch in size illustrating frame configuration and anchors.
- E. Manufacturer's Installation Instructions: Submit installation requirements and rough-in dimensions.

### 1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 Closeout Procedures.
- B. Section 01 78 20 Operation and Maintenance Data.

#### 1.5 QUALITY ASSURANCE

- A. Fire Resistance Ratings: Where indicated as fire rated provide assemblies from manufacturers listed in UL Directory or Intertek Testing Services (Warnock Hersey Listed) Directory.
- B. Fire Rated Horizontal Access Doors: Rating as indicated on Drawings.
   1. Tested Rating: Determined in accordance with ASTM E119.
- C. Attach label from agency approved by authority having jurisdiction to identify each fire rated access door.

#### 1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified with minimum three years documented experience, and with service facilities within 100 miles of Project.

#### 1.7 COORDINATION

- A. Section 01 31 00 Project Management and Coordination: Requirements for coordination.
- B. Coordinate Work with work requiring controls, valves, traps, dampers, cleanouts, and similar items requiring operation being located behind finished surfaces.

#### PART 2 PRODUCTS

#### 2.1 ACCESS DOORS AND PANELS

- A. Manufacturers:
  - 1. J. L. Industries.
  - 2. Karp Associates, Inc.
  - 3. Nystrom Products Co.
  - 4. Milcor LTD, Partnership.
  - 5. Substitutions: Section 01 60 00 Product Requirements.
- B. Flush Framed Access Doors (Type 1): Frames and nominal 1-inch wide exposed flanges of 16 gage steel and door panels of 14 gage steel.
- C. Gypsum Board Access Doors (Type 2): Frames and nominal 1-inch wide flanges of 16 gage steel and door panels of 14 gage steel. Design flanges to be concealed by gypsum board joint finishing compound specified in Section 09 26 00.
- D. Recessed Wall Access Doors (Type 4): Frames and nominal 1-inch wide flanges of 14 gage steel and door panels of 16 gage steel. Door recessed <sup>1</sup>/<sub>2</sub>" with factory installed <sup>1</sup>/<sub>2</sub>" gypsum board. Flanges to be concealed by gypsum board joint finishing compound specified in Section 09 26 00.
- E. Fire Rated Access Doors (Type 5): Frames and nominal 1-inch wide exposed flanges of minimum 16 gage steel and door panels of 20 gage steel. Provide self-closing and latching doors with keyed lock to match cylinders specified in Section 08 71 00.

#### 2.2 FABRICATION

A. Fabricate units of continuous welded construction; weld, fill, and grind joints to assure flush and square unit.
### B. Wall and Ceiling Access Door and Panel Hardware:

- 1. Hinge: Standard continuous or concealed spring pin type, 175-degree steel hinges.
  - 2. Lock: Self-latching lock. Screw driver slot for quarter turn cam lock.
- C. Floor Hatch Hardware:
  - 1. Hinge: 175-degree steel continuous hinge with removable pin concealed constant force closure spring type.
  - 2. Lock: Self-latching lock. Screw driver slot for quarter turn cam lock. Cylinder lock with latch, two keys for each unit.
- D. Size Variations: Obtain acceptance of manufacturer's standard size units which vary slightly from sizes shown or scheduled.

### 2.3 SHOP FINISHING

- A. Base Metal Protection: Prime coat units with baked on primer.
- B. Finish: One coat baked enamel, color as selected.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01 31 00 Project Management and Coordination: Coordination and project conditions.
- B. Verify rough openings for access doors and panels are correctly sized and located.

# 3.2 INSTALLATION

- A. Secure frames rigidly in place, plumb and level in opening, with plane of door and panel face aligned with adjacent finished surfaces.
  - 1. Set concealed frame type units flush with adjacent finished surfaces.
- B. Position unit to provide convenient access to concealed work requiring access.
- C. Install fire rated units in accordance with NFPA 80 and requirements for fire listing.

### 3.3 SCHEDULES

- A. Gypsum Board Ceilings: Type 2, 24 x 24-inch size, screwdriver slot lock, primed and one coat baked enamel "White".
- B. Gypsum Board Walls: Type 4, 36x 24-inch size, cylinder lock. Paint to match adjacent finish.
- C. Washroom Walls Above Urinal Valves: Type 1, 12 x 12-inch size, cylinder lock, primed and two coat baked enamel to match ceramic tile color.
- D. Fire Rated Masonry Walls: Type 5, 12 x 12-inch size, cylinder lock, primed.

### END OF SECTION

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## SECTION 08 33 36 OVERHEAD COILING DOORS

### PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. Overhead coiling insulated doors.

#### 1.2 RELATED SECTIONS

- A. Section 05 50 00 Metal Fabrications: Support framing and framed opening.
- B. Section 26 05 33 Raceway and Boxes for Electrical: Conduit from electric circuit to door operator and from door operator to control station.

### 1.3 REFERENCES

- A. ANSI/DASMA 108 American National Standards Institute Standard Method for Testing Sectional Garage Doors and Rolling Doors: Determination of Structural Performance Under Uniform Static Air Pressure Difference.
- B. NFRC 102 Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.
- C. ASTM E 90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Element.
- D. ASTM E 330 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- E. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- F. ASTM A 666 Standard Specification for Austenitic Stainless-Steel Sheet, Strip, Plate, and Flat Bar.
- G. ASTM A 924 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- H. ASTM B 221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- I. NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum).
- J. NEMA MG 1 Motors and Generators.

#### 1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Overhead coiling insulated doors:
  - 1. Wind Loads: Design door assembly to withstand wind/suction load of 20 psf (958 Pa) without damage to door or assembly components in conformance with ASTM E 330.

- 2. Operation: Design door assembly, including operator, to operate for not less than 20,000 cycles.
- B. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

# 1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Details of construction and fabrication.
  - 4. Installation instructions.
- C. Shop Drawings: Include detailed plans, elevations, details of framing members, anchoring methods, required clearances, hardware, and accessories. Include relationship with adjacent construction.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and patterns.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

## 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years' experience in the fabrication and installation of security closures.
- B. Installer Qualifications: Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.
- 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, color, and sheen are approved by Architect.
  - 3. Refinish mock-up area as required to produce acceptable work.

### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.
- C. Store materials in a dry, warm, ventilated weathertight location.

#### 1.8 PROJECT CONDITIONS

A. 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.

### 1.9 COORDINATION

- A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.
- 1.10 WARRANTY
  - A. Warranty: Manufacturer's limited door and operator system, except the counterbalance spring and finish, to be free from defects in materials and workmanship for 3 years or 20,000 cycles, whichever occurs first.
  - B. Warranty: Manufacturer's limited door system warranty for 2 years for all parts and components.
  - C. Powder Guard Finish
    - 1. Powder Guard Zinc Base Coat applied to guides, bottom bar, head plates plus PowderGuard Premium applied to curtain and top coat for guides, bottom bar, head plates: Manufacturer's limited Zinc Finish warranty for 4 years.

### PART 2 PRODUCTS

## 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Overhead Door Corp., 2501 S. State Hwy. 121, Suite 200, Lewisville, TX 75067. ASD. Tel. Toll Free: (800) 275-3290. Phone: (469) 549-7100. Fax: (972) 906-1499. Web Site: www.overheaddoor.com. E-mail: info@overheaddoor.com.
- B. Substitutions: Equal products when approved prior to bid.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.
- 2.2 INSULATED OVERHEAD COILING SERVICE DOORS
  - A. Overhead Coiling Stormtite Insulated Service Doors: Overhead Door Corporation Model 625.

- 1. Curtain: Interlocking roll-formed slats as specified following. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
  - a. Flat profile type F-265i for doors up to 40 feet (12.19 m) wide.
  - b. Front slat fabricated of:
    - 1) 20-gauge galvanized steel.
  - c. Back slat fabricated of:
    - 1) 22-gauge galvanized steel.
  - d. Slat cavity filled with CFC-free foamed-in-place, polyurethane insulation.
    - 1) R-Value: 7.7, U-Value: 0.13.
    - 2) Sound Rating: STC-21.
- 2. Performance:
  - a. Through Curtain Sound Rating: Sound Rating: STC-28 (STC-30+ with HZ noise generator) as per ASTM E 90.
  - b. Installed System Sound Rating: STC-21 as per ASTM E 90.
  - c. U-factor: 0.91 NFRC test report, maximum U-factor of no higher than 1.00.
  - d. Air Infiltration: Meets ASHRAE 90.1 & IECC 2012/2015 C402.4.3 Air leakage <1.00 cfm/ft2.
- 3. Weatherseals:
  - a. Vinyl bottom seal, exterior guide and internal hood seals.
  - b. Interior guide weatherseal.
  - c. Lintel weatherseal.
  - d. Air Infiltration Package, IECC 2012/2015 listed; product to meet C402.4.3 2012 Air leakage <1.00 cfm/ft2.
    - 1) Air infiltration perimeter seal package includes: guide cover, guide cap, dual brush exterior guide seal, 4-inch finned lintel brush seal and vinyl bottom seal.
- 4. Guides: Three structural steel angles.
- 5. Brackets:

- a. Galvanized steel to support counterbalance, curtain and hood.
- 6. Finish; Bottom Bar, Guides, Headplate and Brackets:
  - a. Finish: Black powdercoat finish.
  - b. Finish: PowderGuard Zinc base coat, gray with PowderGuard Premium powder coat color as selected by the Architect.
- 7. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch per foot of span. Counterbalance is adjustable by means of an adjusting tension wheel.
- 8. Hood: Provide with internal hood baffle weatherseal.
  - a. 24-gauge galvanized steel with intermediate supports as required.
  - Manual Operation:
  - a. Chain hoist.
- 10. Electric Motor Operation: Provide UL listed electric operator, size as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second.
  - a. Sensing Edge Protection:
    - 1) Electric sensing edge.
  - b. Operator Controls:
    - 1) Push-button and key operated control stations with open, close, and stop buttons.
    - 2) Controls for both interior and exterior location.
    - 3) Controls surface mounted.
  - c. Special Operation:
    - 1) Radio control operation.

- 2) Card reader control.
- Motor Voltage: 115/230 single phase, 60 Hz.
- 11. Windload Design:
  - a. Standard windload shall be 25 PSF.
- 12. Locking:

d.

- a. Interior slide bolt lock for electric operation with interlock switch.
- 13. Wall Mounting Condition:
  - a. Face-of-wall mounting.
  - b. Between jambs mounting.

### PART 3 EXECUTION

- 3.1 EXAMINATION
  - A. Verify opening sizes, tolerances and conditions are acceptable.
  - B. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.
  - C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of electrical service with Division 26. Complete wiring from disconnect to unit components.
- F. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 90 00.
- G. Install perimeter trim and closures.
- H. Instruct Owner's personnel in proper operating procedures and maintenance schedule.

### 3.4 ADJUSTING

- A. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.
- B. Adjust hardware and operating assemblies for smooth and noiseless operation.
- 3.5 CLEANING
  - A. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.
  - B. Remove labels and visible markings.
  - C. Touch-up, repair or replace damaged products before Substantial Completion.
- 3.6 PROTECTION
  - A. Protect installed products until completion of project.

# 3.7 SCHEDULE BY DOOR NUMBER

- A. Door Nos. 122A, 122C, and 101D: 12'w x 9'-0"h Existing opening with existing coiling door to be replaced. Existing door has been installed in a supplementary steel frame constructed to the interior of the opening. Contractor shall cut free the existing door and guides and then install the new door and welded clips.
- B. Door No. 101E: 12'w x 9'-0"h Existing opening with existing coiling door to be replaced. Existing door is mounted tot the face of the exterior brick. Door shall be removed from the exterior brick and then existing masonry shall be patched and cleaned. The new door shall be placed to the interior. Head shall be mounted below existing conduits. Hood bottom will be approximately 6" below masonry opening lintel. Guides will be installed with expansion bolts to existing CMU wall.
- C. Door 124: 6' x 8'-0" steel weave mesh grille. See Section 08 31 00.

# END OF SECTION

#### SECTION 08 41 00 ALUMINUM FRAMED STOREFRONTS

#### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Work of this Section includes materials, labor, equipment, services necessary to complete the installation of the monumental lobby storefront, as indicated on the Drawings and specified herein, including the following:
  - 1. Lobby storefront system consisting of a faceted stick-built aluminum frame system that is four-sided structurally glazed, with fixed vision units.
  - 2. Entrance systems including glass enclosed vestibule and entry glass doors.
  - 3. Glass and glazing in conjunction with the work of this Section.
  - 4. All necessary steel or aluminum members where required to support, strengthen and/or reinforce aluminum members.
  - 5. Sealants, caulking, joint fillers, gaskets, fasteners, weeps, closures, flashings, trim, as shown or as may be required in conjunction with the system or to join the system to adjacent construction.
  - 6. Anchors, embeds with engineering and layout drawings.
  - 7. Two continuous lines of caulking to be provided throughout.
  - 8. Metal flashing
  - 9. Safety glass where required by Code.
  - 10. Visual Mock-up (approx.400 sq. ft.). Include lobby storefront typical head, intermediate horizontal mullion, sill, and jamb.
- B. Related Sections:
  - 1. Section 07 90 00 Joint Protection: System perimeter sealant and back-up materials.
  - 2. Section 08 71 00 Door Hardware: Mortised hardware reinforcement requirements affecting framing members; hardware items other than specified in this section.
  - 3. Section 08 80 00 Glazing.
  - 4. Single Source Requirement: All products listed below shall be from same manufacturer.
    - a. 08 44 13 Glazed Aluminum Curtainwall.

#### 1.2 REFERENCES

- A. Work shall comply with governing agencies having jurisdiction. Project will be filed under IBC 2015 Building Code.
- B. Aluminum Association:
  - 1. AA ADM 1 Aluminum Design Manual.
- C. American Architectural Manufacturers Association:
  - 1. AAMA 501 Methods of Test for Exterior Walls.
  - 2. AAMA 502 Voluntary Specification for Field Testing of Windows and Sliding Glass Doors.
  - 3. AAMA 503 Voluntary Specification for Field Testing of Metal Storefronts. Curtain Wall and Sloped Glazing Systems.
  - 4. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum.
  - 5. AAMA 1503 Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
  - 6. AAMA 2603 Voluntary Specification, Performance Requirements and Test

- Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- 7. AAMA 2604 Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
- 8. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- 9. AAMA CW-10 Care and Handling of Architectural Aluminum from Shop to Site.
- 10. AAMA MCWM-1 Metal Curtain Wall Manual.
- 11. AAMA SFM-1 Aluminum Store Front and Entrance Manual.
- D. American Society of Civil Engineers:
  - 1. ASCE 7 Minimum Design Loads for Buildings and Other Structures.
- E. ASTM International:
  - 1. ASTM A36/A36M Standard Specification for Carbon Structural Steel.
  - 2. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 3. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 4. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 5. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 6. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 7. ASTM E283 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - 8. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  - 9. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  - 10. ASTM E547 Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
  - 11. ASTM E1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
- F. National Fenestration Rating Council Incorporated:
  - 1. NFRC 100 Procedures for Determining Fenestration Product U-Factors.
- G. National Fire Protection Association:
  - 1. NFPA 255 Standard Method of Test of Surface Burning Characteristics of Building Materials.
- H. SSPC: The Society for Protective Coatings:
  - 1. SSPC Paint 20 Zinc-Rich Primers (Type I Inorganic and Type II Organic).
  - 2. SSPC Paint 25 Red Iron Oxide, Zinc Oxide, Raw Linseed Oil, and Alkyd Primer.
- I. Underwriters Laboratories Inc.:
  - 1. UL 723 Tests for Surface Burning Characteristics of Building Materials.

## 1.3 TESTING AND PERFORMANCE REQUIREMENTS

- A. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners. The wall shall be designed so that failure of any one element (e.g. bolt, anchor, embed) will not result progressive failure of the wall.
  - 1. Design pressures shall comply with ASCE7.
- B. Test Reports: Provide manufacturer's test data from accredited third-party testing agency showing compliance with specified performance requirements.
  - 1. Uniform Load Deflection:
    - At 100% design wind pressure:
      - a. Deflection Normal to Wall Plane: Net deflection for aluminum framing members supporting glass shall not exceeding L/175 or 3/4 inch, whichever is less.
      - b. Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch, whichever is less.
      - c. At 50 percent of design pressures, glass center deflection relative to glass edges shall not exceed L/50 or one inch.
  - 2. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
  - 3. Air Infiltration:
    - a. Fixed Wall: Limit air leakage through assembly to 0.06 cfm/sq. ft of wall area at 6.24 psf static air pressure difference, when tested in accordance with ASTM E283.
    - b. Entry Doors: 0.50 cfm/sq. ft for single doors, 1.00 cfm/sq. ft for doors hinged in pairs, when tested at 1.567 psf per ASTM E283.
  - 4. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and inner sheet of infill panel and heel bead of glazing compound.
  - 5. Water Penetration under Static Pressure: Test system in accordance with ASTM E331.
    - a. Performance: No leakage when tested in at specified test pressure.
    - b. Test Pressure: Not less than 20 percent of design wind pressure, with minimum pressure differential of 2.86 lbf/sq. ft and maximum of 12.00 lbf/sq. ft.
  - 6. Thermal Transmittance of Assembly (Excluding Entrances): Maximum U Value of 0.45 Btu/sq. ft per hour per deg F when measured in accordance with AAMA 1503 and NFRC 100. SHGC shall be 0.28
  - 7. Condensation: There shall be no interior condensation on visible surfaces or those that would wet insulation when the wall is subjected to  $0^{\circ}$  F exterior,  $70^{\circ}$  F interior, 30% interior relative humidity, 15 mph exterior wind.
  - 8. Thermal component shall be based on minimum material temperature increase of 200 degrees F and decrease of 180 degrees F relative to nominal condition. Assume entire cross section has uniform temperature. Components including adhesives and sealant shall be capable of withstanding, without failure, design temperatures with simultaneous specified loads. For thermal design other than joint movement, design winter surface temperature is -20 degrees F. Design

summer surface temperature shall be at least 180 degrees F. All components including adhesives and sealants shall be capable of withstanding (and remain durable) without failure design temperatures with simultaneous specified loads.

- 9. Building Movements:
  - a. The exterior wall system and components shall be designed to accommodate erection tolerances. The documents shall require the contractor to field measure. Final tolerances shall be coordinated among the various materials.
  - b. The exterior wall system shall be capable of accommodating a +/- 1.5" tolerance in building structure. This tolerance is intended to account for placement of concrete and steel and initial deflection that could occur prior to panel wall installation (short term movements). These tolerances will be taken up within the anchorage system designed by the curtain wall vendor. The unitized wall system and components shall be capable of accommodating live load and dead load movements including anticipated drift as provided by the Structural Engineer.
  - c. Provide movable joints to accommodate the full range of manufacturing tolerances, field tolerances, building sway, seismic movement and floor sag. Provide for inter-story movement due to live load deflection, building drift and thermal movement. Accommodate displacement of adjacent stories: Project Structural Engineer to provide values.
    - 1. Live Load Deflection of Structure: The greater of L/360 or 1"
    - 2. Long Term Creep and Column Shortening: The greater of L/360 or 1"
    - 3. Wind Lateral Drift: H/600
    - 4. Seismic Lateral Movement: H/400
  - d. Lateral displacement of any floor, measured parallel to the facade or perpendicular to the facade shall be assumed to occur while floors immediately above and below remain totally stationary. There shall be no failure or gross permanent distortion of anchors, frames, glass, or panels; gaskets and weather strips shall not disengage; weather seals shall not fail.
  - e. The wall system and components shall be designed to meet code seismic requirements.
- 10. Acoustic Performance: None.
- 11. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior by weep drainage network.

### 1.4 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.
  - 1. Provide large scale shop drawings for fabrication, installation and erection of all parts of work.
  - 2. Provide plans, elevations, and details of anchorages, connections and accessory items.
  - 3. Identify all materials including metal alloys, glass types, fasteners, sealant, glazing materials, sizes, thickness and finishes.
  - 4. Identify all shop and field sealants by product name and locate on drawings.
  - 5. Provide installation templates for work installed by others.
  - 6. Show interfaces and relationships to work of other trades.

- C. Product Data: Submit manufacturers printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material used.
  - 1. Provide certifications that materials and systems comply with specified requirements.
  - 2. Submit component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, and internal drainage details.
- D. Samples: Submit two samples 12 x 12 inches in size illustrating each material that is to be exposed in completed work (finished aluminum surface, infill panels, glazing materials, etc.).
  - 1. Show full color ranges and finish variations expected.
- E. Design Data: Indicate framing member structural and physical characteristics, calculations, dimensional limitations.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- G. Calculations: Provide professionally prepared calculations and certification of performance of this work. Calculations shall be signed and sealed by a Professional Engineer registered in the State of Maryland.
  - 1. Indicate how design requirements for loading and other performance criteria have been satisfied.
- H. Test Reports: Provide certified test reports for specified tests from a qualified independent testing agency showing compliance with performance requirements based on comprehensive testing of manufacturer's systems.
- I. Thermal models for typical head, sill, jamb conditions.
- J. Submit Quality Assurance/Quality Control Program for the manufacture and installation of the storefront units, prior to start of work.
- K. Submit confirmation of compliance with Energy Code requirements.
- L. Submit sealant lab test reports for adhesion, compatibility and staining for all sealant/substrate combinations.
- M. Submit plan reviews by sealant and glass manufacturer approving details are suitable for the use of their product.
- N. Glass load-stress analysis verifying glass thickness, make-up and heat treatment.
- O. Signed and sealed as-built drawings and calculations for Owner records.
- P. Submit maintenance manual for all aluminum windows and doors including glass and glazing.

# 1.5 QUALITY ASSURANCE

- A. Visual Aesthetic Mock-up: Construct and erect a typical storefront module, including full size glass, for aesthetic review prior to commencement of construction. Scope of visual mockup to be 400 sq. ft.
- B. Perform Work in accordance with AAMA SFM-1 and AAMA MCWM-1 Metal Curtain Wall, Window, Store Front and Entrance Guide Specifications Manual.

# 1.7 QUALIFICATIONS

- A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum ten years documented experience, and with service facilities within 100 miles of Project.
- B. Design structural support framing components under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Maryland.

# 1.8 PRE-INSTALLATION MEETINGS

- A. Section 01 31 00 Project Management and Coordination: Pre-installation meeting.
- B. Convene minimum two weeks prior to commencing work of this section.

## 1.9 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 Product Requirements: Product storage and handling requirements.
- B. Handle Products of this section in accordance with AAMA MCWM-1 Curtain Wall Manual #10.
- C. Protect finished aluminum surfaces with wrapping or strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
- D. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Store under cover and protect from weather damage.

# 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 Product Requirements.
- B. Do not install sealants nor glazing materials when ambient temperature is less than 40 degrees F during and 48 hours after installation.

### 1.11 COORDINATION

A. Section 01 31 00 – Project Management and Coordination: Coordination and project conditions.

# 1.12 WARRANTY

- A. Section 01 77 00 Closeout Procedures: Product warranties and product bonds.
- B. The overall system shall be warranted for no less than five (5) years, material and labor, including faulty glass replacement. Certain materials and components shall have longer warranties (sealants). The manufacturers shall state the warranties included and any premium to increase warranties if requested by the Owner. System warranty includes materials and labor and is a joint warranty signed by both the manufacturer and the Trade Contractors
- C. Insulated Glass Unit Warranty: Insulated glass units edge seal shall be warranted for a period of 10 Years (Replacement Labor included) and 10 Years (Material). The warranty for the glass must include labor and material in the event of a "systemic failure."
- D. Aluminum Finish Warranty: Ten (10) years material and labor warranty
- E. Sealant Warranty: Twenty (20) year material and labor warranty

F. Provide written warranty, signed by manufacturer, agreeing to repair or replace work that exhibits defects in materials or workmanship. "Defects" is defined to include, but not limited to, leakage of water, abnormal aging or deterioration, abnormal deterioration or fading of finishes, and failure to perform as required. Include requirement for removal and replacement of covering and connected adjacent work.

# PART 2 PRODUCTS

# 2.1 ALUMINUM-FRAMED STOREFRONTS

- A. Manufacturers:
  - 1. Kawneer Co., Inc.; Trifab 451UT (Basis of Design)
  - 2. Wausau
  - 3. EFCO Corp.
  - 4. Traco.
  - 5. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description:
  - 1. Aluminum Frame: Thermally broken; applied glazing stops; drainage holes; internal weep drainage system. Frames for interior glazing need not to be thermally broken. Size mullions as required to withstand loads. The design intent is to avoid having an exposed steel bracing at the lobby and use internal reinforcement to limit deflection.
  - 2. Mullions: Profile of extruded aluminum with internal reinforcement of aluminum or shaped steel structural section.
  - 3. Doors: Aluminum framed thermally broken, insulated (Megatherm 50XT) glass doors; 1-3/4 inches thick, nominal 6-inch-wide top rail and vertical stiles, nominal 10-inch-wide bottom rail (medium stile) with; square glazing stops.

# 2.2 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical, 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209, 5005 alloy, H15 or H34 temper.
- C. Sheet Steel: ASTM A653/A653M; galvanized to minimum G90.
- D. Steel Sections: ASTM A36/A36M; shaped to suit mullion sections, galvanized.
- E. Glass:
  - 1. Glass shall be 1" dual sealed insulating glass units with 1/4" typical lites and  $\frac{1}{2}$ " air space meeting ICGG CBA rating. Glass thicknesses should be increased where required by load, code and to meet flatness criteria defined here within. The glass should be provided with a ten (10) year warranty. The warranty for the glass must include labor in the event of a "systemic failure".
    - a. Storefront glass consists of vision IGU that has low-iron, heat strengthened glass, with a low-e coating on #2 surface.
    - b. Refer to Section 08 80 00.
  - 2. Glass shall be as selected by Architect or approved equal, Glass manufacturers to include Viracon, Interpane, or approved equal.
  - 3. Each vendor bidding the project shall confirm that the glass types installed within their system meets the Energy Code requirements.

required by Code and in general adjacent to doors, within 18" of finished floor, and where windows could be mistaken for means of egress.

- 5. Tempered glass shall be used only where required by code or load and shall be heat soaked to reduce the probability of spontaneous breakage.
- 6. The IGU center deflection relative to glass edges at 50 percent of specified design pressures shall not exceed 1". Glass deflection at 1.5 times design pressures shall be limited to prevent disengagement from frame.
- 7. All glazing details shall be reviewed and accepted by the glass manufacturer.
- 8. The glass manufacturer shall perform a thermal, stress, compatibility and load analysis.
- 9. The glass manufacturer shall review and advise on thermal stresses on glass due to heat build-up from window treatment placement. Window vendors to provide specific instructions for placement of window treatments adjacent to window system.
- 10. Primary insulated glass seal, polyisobutylene (PIB), to have a minimum of onehalf of the bond width in contact with the deleted glass surface.
- 11. Primary insulated glass seal, polyisobutylene (PIB), to be fully compatible with all adjacent substrates and materials.
- 12. Secondary structural sealant within the insulated glass unit (IGU) must be processed in a closed system free from exposure to air. There must be no air entrained in the secondary structural IGU edge seal.
- 13. When using patterned insulated glass, there may be a potential to see a moiré pattern develop in the glass when viewed in certain light conditions and at specific solar angles. Moiré is an optical phenomenon that may present itself as a "wavy, rippled or circular" pattern under certain conditions. Moiré patterns can be created whenever one semi-transparent object with a repetitive pattern is placed over another. It is recommended that a full-size mock-up be evaluated if patterned glass is being considered. The mock-up should be installed at the building site to better evaluate lighting conditions and be viewed at different times of day and under varying temperature conditions.
- 14. Optical Clarity and flatness shall be judged by the Architect from full-size glass samples and through the sample submission. The visual and performance mock-up shall represent the range of quality to be provided for the project. Rollerwaves on heat treated glass shall all be orientated in the same orientation, parallel to grade. Maximum peak to valley rollerwave shall be 0.003" in the center of the glass and 0.008" within 14" of the leading and trailing edge of the glass. The overall bowwarp of the glass shall be per ASTM standards. Glass observed with visible iridescence or quench marks from the heat treat process shall be rejected and replaced. Color variation between should not exceed 2 delta-E from the approved sample.
- F. Glazing Materials: As specified in Section 08 80 00.
- G. Hardware: Furnish manufacturer's standard door hardware for types of doors and applications indicated, and as specified below.
  - 1. Weather Stripping: Polypropylene pile, continuous and replaceable.
  - 2. Sill Sweep Strips: Resilient seal type, of neoprene compound.

- 3. Threshold: Specified in Section 08 71 00.
- 4. Hinges: Specified in Section 08 71 00.
- 5. Push/Pull: Specified in Section 08 71 00.
- 6. Panic Device: Specified in Section 08 71 00.
- 7. Closer: Specified in Section 08 71 00.
- 8. Finish: Exposed hardware to match hardware finishes specified in Section 08 71 00.
- 9. Lock Cylinders: Specified in Section 08 71 00.
- H. Flashings: Minimum 0.032-inch-thick aluminum to match mullion sections where exposed.
- I. Sill Flashing: Storefront to be installed on top of a stainless-steel flashing with drip edge. Flashing shall be bed in sealant.
- J. Sealant and Backing Materials:
  - 1. Sealant Used within System (Not Used for Glazing): Manufacturer's standard materials to achieve weather, moisture, and air infiltration requirements.
  - 2. Perimeter Sealant: Specified in Section 07 90 00.
  - 3. Glazing sealants shall be high-grade, non-staining non-bleeding silicone. Sealants within the systems shall be compatible and adhere to silicone. The perimeter sealant between system and adjacent material shall be high-grade silicone. Sealant colors to be selected by the architect. Manufacturer testing shall be performed prior to construction including laboratory testing to confirm adhesion, compatibility, and staining of applicable surfaces and materials. Sealant shall be Dow Corning or Momentive.
  - 4. Sealants shall contain a 20-year VIP material and labor warranty.
  - 5. Responsibility for sealant work shall be included in the exterior wall contract to obtain a single source warranty. Sealant work within the wall system, and between the wall system and adjacent construction shall be in the wall vendor's contract.
  - 6. Rain screen systems utilizing gaskets are equally acceptable and subject to compliance with performance requirements. Outdoor gaskets shall be silicone, neoprene, or Santoprene. Indoor gaskets shall be silicone, neoprene, Santoprene, or EPDM.
- K. Fasteners: Provide Non-magnetic Stainless steel, warranted by manufacturer to be noncorrosive and compatible with aluminum components.
  - 1. All fasteners exposed to moisture shall be series 300 stainless steel.
  - 2. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 3. Reinforce members as required to receive fastener threads.
- L. Brackets and Reinforcement: Non-magnetic stainless steel or hot-dip galvanized steel complying with ASTM A386.
- M. Concrete/Masonry Inserts: Hot-dip galvanized steel complying with ASTM A 386.
- N. Anchor clips and aluminum surfaces that receive sealant shall be anodized or painted. No mill finish shall be used on surfaces exposed to moisture or to receive sealant.

- O. Dissimilar Metal Separation: Separate dissimilar metals with bituminous paint or plastic shims.
- P. Bituminous Coatings: Cold-applied asphalt mastic compounded for 30 mil thickness per coat.
- Q. Setting blocks: Provide setting blocks at the sill quarter points of all glass lites. Setting blocks shall be heat cured silicone rubber with a hardness of 80 to 90 durometer, Shore A, a minimum length of 4", and a minimum width, which will perimeter full support of both panes of glass in an insulating glass unit or a monolithic unit no matter how positioned within the glazing rabbet. Location of setting blocks at glass quarter points is acceptable. Distance from vertical glass edge to nearest edge of setting block shall not be less than six inches.

# 2.3 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Reinforce interior horizontal head rail to receive drapery track brackets and attachments.
- F. Prepare components with internal reinforcement for door hardware.
- G. Reinforce framing members for imposed loads.
- H. Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator to prevent corrosion.

### 2.4 SHOP FINISHING

- A. Clear Anodized Aluminum Surfaces: AAMA 611, AA-M12C22A41 non-specular as fabricated mechanical finish, medium matte chemical finish, and Architectural Class I 0.7 mils clear anodized coating.
- B. Concealed Steel Items: Galvanized to ASTM A123/A123M; minimum 2.0 oz/sq. ft coating thickness; galvanize after fabrication. Unfinished.
- C. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.
- D. Shop and Touch-Up Primer for Steel Components: SSPC Paint 25 red oxide.
- E. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.
- F. Extent of Finish:
  - 1. Apply factory coating to surfaces exposed at completed assemblies.
  - 2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.
  - 3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.

### PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 31 00 Administrative Requirements: Coordination and project conditions.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify wall openings and adjoining air and vapor seal materials are ready to receive Work of this Section.

### 3.2 INSTALLATION

- A. Install wall system in accordance with AAMA MCWM-1 Metal Curtain Wall, Window, Store Front and Entrance Guide Specifications Manual.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent Work to form water tight dam.
- G. Coordinate attachment and seal of perimeter air and vapor retarder materials.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install integral flashings and integral joint sealers.
- J. Set thresholds in bed of mastic and secure.
- K. Install hardware using templates provided. Refer to Section 08 71 00 for installation requirements.
- L. Install infill panels using method required to achieve performance criteria.
- M. Coordinate installation of glass with Section 08 80 00; separate glass from metal surfaces.
- N. Coordinate installation of perimeter sealants with Section 07 90 00.
- O. Provide protection against galvanic action. Isolate dissimilar materials with bituminous coating or non-absorptive dielectric tape.
- P. Install aluminum entrance doors and storefront framing in openings prepared under other sections plumb, square, level, in exact alignment with surrounding work, with proper clearances and securely and positively anchored to building structure, to meet performance requirements specified herein, in accordance with manufacturers published instructions and approved submittals.

### ALUMINUM FRAMED STOREFRONTS

### 3.3 ERECTION TOLERANCES

- A. Section 01 40 00 Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

### 3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspection to monitor quality of installation and glazing.
- C. Test to ASTM E1105.

# 3.5 ADJUSTING

- A. Section 01 77 00 Closeout Procedures: Testing, adjusting and balancing.
- B. Adjust operating hardware for smooth operation.

# 3.6 CLEANING

- A. Section 01 77 00 Closeout Procedures: Final cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Remove excess sealant by method acceptable to sealant manufacturer.

# 3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 50 00 Temporary Facilities and Controls: Protecting installed construction.
- B. Protect finished Work from damage during fabrication, shipping, storage, and erection. Exterior wall materials and components shall be stored off the ground and covered until installation. Glass shall be protected to meet the written instructions from the glass manufacturer. All manufacturers shall provide additional handling recommendations and requirements.

### 3.8 SCHEDULES

A. Refer to Drawings.

### END OF SECTION

## SECTION 08 44 13 GLAZED ALUMINUM CURTAINWALL

## PART 1 GENERAL

### 1.1 SUMMARY

- A. Work of this section includes: Materials, labor, equipment, services necessary to complete the installation of the curtain wall, as indicated on the Drawings and or specified herein including the following:
  - 1. All exterior curtainwall and window wall furnished and installed as shown on drawings, specified in this section and designated in the AAMA MCWM-1 "Metal Curtainwall Manual".
  - 2. Curtain Wall at Stair Enclosure: Curtain wall consisting of stick built aluminum frame system that is structurally glazed with fixed vision units and an exterior horizontal trim. Elevation includes a decal at the top of the enclosure that will be a silkscreen image applied to the glass or a surface mounted plaque attached to the curtain wall. The south and west elevations will have frosted glass.
  - 3. Curtain Wall with Fly-By: Curtain wall consisting of stick-built aluminum frame system that is four-sided structurally glazed with fixed vision units and exterior horizontal trim, and fixed exterior metal sun shades attached to the curtain wall. The ends of the curtain wall incorporate a fly-by where a portion of the wall cantilevers past the corners.
  - 4. Sloped Curtain Wall: Consists of a sloped stick-built aluminum frame that is structurally glazed with exterior horizontal trim. Includes intermediate lateral connections at mid span. System will have integrated pocket shades and tracks at locations designated by the architect.
  - 5. All labor, materials, tools, equipment and services needed to furnish and install curtain wall.
  - 6. Components furnished with installed curtain wall.
  - 7. Installation accessories furnished and installed.
  - 8. Glass and glazing in conjunction with the work of this Section.
  - 9. All necessary steel or aluminum members where required to support, strengthen and or reinforce aluminum members.
  - 10. Sealants, caulking joint fillers, gaskets, fasteners, vents and weeps, weep tubes, bellows, closures, gutters, end dams, flashings, trim, as shown or as required in conjunction with the system or to join the system to adjacent construction.
  - 11. Curtain wall anchors at floor slab edges, reinforcement, and anchor attachments to the building structure. Anchor may be placed at the face of slab where a top of slab anchor is not possible. Provide layouts, details and requirements for anchorage points for approval by the Structural Engineer.
  - 12. Two continuous lines of sealant shall be used throughout.
  - 13. Metal copings and coordination with counter flashings, waterproofing membranes and interfaces with roofing.
  - 14. Parapet at the Roof Curtain wall bypasses roof slab and should be configured in a manner that allows roofing/base flashing to be integrated into the wall. Include back up support, such as galvanized flashing, for the roofing.
  - 15. Provide painted aluminum closures at the interior side of the curtain wall at both the ceiling and floor interfaces to cover the setting space and fire safing.

- 16. Safety glass where required by Code.
- 17. Thermal insulation and vapor barrier as shown on the drawings and specified herein.
- 18. Fire safing and smoke seal at the perimeter of the slab.
- 19. Shop drawings, engineering calculations, erection drawings, samples and conformance test data.
- 20. Thermal modeling.
- 21. Protection and cleaning as defined herein.
- 22. Field Measurements of adjacent and or supporting construction and verification of existing conditions.
- 23. Field touch up of finishes after installation and final adjustments.
- 24. Attic stock.
- B. Related Sections
  - 1. Section 07 90 00 Joint Protection: System perimeter sealant and back-up materials.
  - 2. Section 08 71 00 Door Hardware: Mortised hardware reinforcement requirements affecting framing members; hardware items other than specified in this section.
  - 3. Section 08 80 00 Glazing.
  - 4. Single Source Requirement: All products listed below shall be from same manufacturer.
    - a. 08 41 00 Aluminum Framed Storefronts

### 1.2 REFERENCE

- A. Work shall comply with governing agencies having jurisdiction. Project will be filed under IBC 2015 Building Code.
- B. Refer to AAMA MCWM-1 "Metal Curtainwall Manual" for a complete list of references and industry standards.

### 1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified herein representing those indicated for this Project without failure due to defective manufacture, fabrication, installation or other defects in construction.
  - 1. Glazed aluminum curtain walls shall withstand movements of supporting structure and deflection from uniformly distributed and concentrated live loads.
  - 2. Failure also includes the following:
    - a. Thermal stresses transferring to building structure.
    - b. Glass breakage.
    - c. Noise vibration created by wind and thermal and structural movements.
    - d. Loosening or weakening fasteners, attachments, and other components.
    - e. Failure of operating units.
- B. Delegated Design: Design glazed aluminum curtain walls including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Maryland, including but not limited to story drift, twist, column shortening, long term creep, seismic, using performance requirements and design criteria indicated. Submit calculations for review by the architect, project structural engineer, and consultants prior to fabrication.

- C. Testing: Where manufacturer's standard curtain wall complies with requirements and has been tested in accordance with specified tests in the last 3 years, provide certification with such tests for the record only. Perform required laboratory mock-up tests through an AAMA accredited testing laboratory or agency and provide certified test results to the Architect and Owner for information and record. All evaluation and test specimens shall be complete assemblies and represent project conditions including reinforcing, anchoring methods, panning and trim. Provide detail drawings associated with the submitted product and results.
- D. Design Wind Loads
  - 1. The design wind pressure for the project will be:
    - a. Per ASCE 7 Analysis
  - 2. All structural components, including meeting rails, mullions and anchors shall be designed accordingly, complying with deflection and stress requirements of Paragraph 1.3.B.
- E. Water, and Structural Performance Requirements
  - 1. When tested in accordance with cited test procedures, curtainwall shall meet or exceed the following performance criteria, as well as those indicated in the AAMA "Metal Curtainwall Manual", unless otherwise noted herein.
  - 2. Air Test Performance Requirements
    - a. Fixed Wall: Limit Air leakage through assembly to 0.06 cfm/sq. ft of wall area at 6.24 psf static air pressure difference when tested in accordance with ASTM E283.
  - 3. Water Test Performance Requirements
    - a. Performance: No leakage when tested at specified test pressure per ASTM E331.
    - b. Test Pressure: Not less than 20 percent of design wind pressure, with minimum pressure differential of 6.24 psf.
  - 4. Structural Test Performance Requirements (at Design Pressure)
    - a. Uniform Load Deflection Test (At 100% design wind pressure)
      - Deflection Normal to Wall Plane: Net deflection for aluminum framing members supporting glass shall not exceed L/175 or <sup>3</sup>/<sub>4</sub> inch, whichever is less, for spans up to 13'-6", and L/240 plus 1/4 inch for spans greater than 13'-6".
        - a) Primary aluminum members shall be 0.125" thick minimum.
        - b) Covers and ornamental sections shall be 0.125" thick minimum and reinforced as required to provide a uniform appearance.
        - c) Overall mullion depths shall be kept to a minimum although structural performance shall govern.
        - d) Reinforcement, if required, shall be within the mullions.
      - 2) Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch, whichever is less.
      - 3) At 50 percent of design pressures, glass center deflection relative to glass edges shall not exceed L/50 or one inch, whichever is less.
  - 5. Structural Test Performance Requirements (at 1.5 x Design Pressure)
    - a. Uniform Load Structural Test
      - 1) Specimen to be tested at 1.5 x design test pressure, both positive and negative, acting normal to plane of wall in accord with ASTM E330.
      - 2) No glass breakage; permanent damage to fasteners, hardware parts, or anchors; damage to make curtainwall insert vents inoperable; or permanent deformation of any main frame member in excess of 0.2% of its clear span.

6. Building Movements:

a.

- The exterior wall system and components shall be designed to accommodate erection tolerances. The documents shall require the contractor to field measure. Final tolerances shall be coordinated among the various materials.
- b. The exterior wall system shall be capable of accommodating a +/-1.5" tolerance in building structure. GC/CM to advise if more or less is needed. This tolerance is intended to account for placement of concrete and steel and initial deflection that could occur prior to curtain wall installation (short term movements). These tolerances will be taken up within the anchorage system designed by the curtain wall vendor. The unitized wall system and components shall be capable of accommodating live load and dead load movements including anticipated drift as provided by the Structural Engineer.
- c. Provide movable joints to accommodate the full range of manufacturing tolerances, field tolerances, building sway, seismic movement, and floor sag. Provide for inter-story movement due to live load deflection, building drift and thermal movement. Accommodate displacement of adjacent stories: Project Structural Engineer to provide values.
  - 1) Live Load Deflection of Structure:\_
  - 2) Long Term Creep and Column Shortening:\_
  - 3) Wind Lateral Drift:\_
  - 4) Seismic Lateral Movement:\_
- d. Lateral displacement of any floor, measured parallel to the façade or perpendicular to the façade shall be assumed to occur while floors immediately above and below remain totally stationary. There shall be no failure or gross permanent distortion of anchors, frames, glass or panels; gaskets and weather strips shall not disengage; weather seals shall not fail.
- e. The wall system and components shall be designed to meet code seismic requirements.
- F. Condensation Resistance and Thermal Transmittance Performance Requirements
  - 1. Perform thermal tests in accordance with NFRC 102 and AAMA 1503, or provide finite element computer thermal modeling and calculations per NFRC 100 or AAMA 507, using DOE/LBL THERM 5.2 and WINDOWS 5.2 software.
    - *a.* Thermal Transmittance (U-Factor) for the overall curtainwall vision area and adjacent framing shall be less than or equal to 0.40 BTU/hr- $ft^2$ -°F.
    - b. Thermal component shall be based on minimum material temperature increase of 200 degrees F and decrease of 180 degrees F relative to nominal condition. Assume entire cross section has uniform temperature. Components including adhesives and sealant shall be capable of withstanding, without failure, design temperatures with simultaneous specified loads. For thermal design other than joint movement, design winter surface temperature is -20 degrees F. Design summer surface temperature shall be at least 180 degrees F. All components including adhesives and sealants shall be capable of withstanding (and remain durable) without failure design temperatures with simultaneous specified loads.
    - c. Condensation Resistance requirements: There shall be no interior condensation when the wall is subjected to 0 degrees F exterior, 70 degrees F interior, 30% interior relative humidity, 15 mph exterior wind.
    - *d.* Solar Heat Gain Coefficient (SHGC) for the overall curtainwall vision area and adjacent framing shall not exceed 0.28.

- G. Acoustic Performance Requirements
  - 1. Perform acoustical tests in accordance with ASTM E90 and ASTM E1425 on the glass type(s) specified in 08 80 00, rigidly supported in aluminum framing of the same product family.
  - 2. "Glass-only" test results shall not be acceptable.
  - 3. Sound Transmission Class (STC) shall not be less than 35.
  - 4. Outdoor-Indoor Transmission Class (OITC) shall not be less than 26.

### 1.4 SUBMITTALS

- A. General Requirements
  - 1. Provide all submittals in a timely manner to meet the required construction completion schedule.
  - 2. Sample warranty.
  - 3. Names of all suppliers (glass, metal paint, etc.) and installers and key personnel including the Engineer of Record who shall be licensed by the State of Maryland, to be provided at the time of bidding.
  - 4. List of similar projects completed and references.
  - 5. Statement of compliance with the design intent and commitment to comply with the Contract Documents. This shall include a line by line specification review noting and qualification or exclusion from the project specification. The bidder should provide information pertaining to proposed alternates or deviations to the documents.
  - 6. Project Schedule from award to substantial completion.
  - 7. Submit Quality Assurance/Quality Control Program for the manufacture and installation of the curtain wall and insulated glass units, prior to start of Work.
  - 8. Submit sealant lab test reports for adhesion, compatibility, and staining for all sealant/substrate combinations.
  - 9. Submit plan reviews by sealant and glass manufacturer approving details are suitable for the use of their product.
  - 10. Thermal models calculated per NFRC standards indicating overall system U-values.
  - 11. Condensation checks showing dew point line per project winter interior design conditions.
  - 12. Glass load-stress analysis verifying glass thickness, make-up and heat treatment.
  - 13. Submit Maintenance Manual for all aluminum windows and doors including glass and glazing.
  - 14. Submit confirmation of compliance with Energy Code requirements.
  - 15. Physical samples requested by the Architect.
  - 16. Project milestone dates for system design, testing, fabrication and erection.
- B. Shop Drawings
  - 1. Shop drawings must be prepared wholly by the curtainwall manufacturer, or a qualified engineering services firm under the direction of the manufacturer. Shop drawings for pre-engineered configurations may be prepared by authorized installers.
  - 2. Proposal Drawings and Test Data: Proposal drawings must include all typical conditions including stack joints, anchors, vent details, shadow box details, corner conditions, termination with adjacent work and tolerances. Proposal

drawings for curtain wall to include elevations with panelization. For windows provide typical head, jamb, and sill conditions.

- 3. Provide design details along with bid proposals to define system aesthetic and functional characteristics.
- 4. Provide up to three photocopied sets of shop drawings, including half size details of all necessary conditions.
- 5. Shop drawings should be coordinated to show surrounding work and should be promptly updated throughout the project as architectural drawings and shop drawings from other trades are updated.
- 6. Show joinery techniques and seals, provision for horizontal and vertical expansion, drainage and weep systems, range of tolerances, glass and metal thicknesses, structural sealant bond widths and framing member profiles.
- 7. Identify all materials, including metal alloys, glass types, fasteners, sealant, and glazing materials, sizes, shapes, thickness, and finishes. Identify all shop and field sealants by product name and locate on drawings. Glazing details shall be at full size scale.
- 8. Make clear by obvious graphic device (bubble, cloud) any and all deviations from the Contract Documents and revisions to shop drawings and submittals.
- 9. Signed and sealed as-built drawings and calculations for Owner records.
- C. Samples
  - 1. Components: Submit samples of anchors, fasteners, hardware, assembled corner sections and other materials and components as requested by Architect.
  - 2. Finish: Submit color samples for Architect's approval as requested.
  - 3. Physical samples, data sheets, performance characteristics, color renderings and bid pricing specifically including all glass types and metal finishes.
  - 4. Submit product data for each product specified, including details of construction relative to materials, dimensions of individual components, profiles and finishes.
  - 5. Submit samples for verification of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include Sample sets show the full range of variations expected.
- D. Test Reports and Calculations
  - 1. Submit certified independent laboratory test reports verifying compliance with all test requirements of 1.3.
  - 2. Previous test reports performed within the last 5 years.
  - 3. Submit structural calculations prepared by a State of Maryland Registered Professional Engineer indicating adequacy of all materials furnished under this section, to meet the uniform and structural load requirements as specified in 1.3.
  - 4. Thermal modeling of curtain wall typical sill, head, jamb conditions.
  - 5. Proposed laboratory mock-up scope, configuration, test procedure and test facility.
  - 6. Submit test reports, calculations, computer analysis and other necessary data from a qualified independent inspecting and testing agency retained by the Contractor indicating compliance with performance requirements of glazed aluminum curtain wall system.

#### 1.5 QUALITY ASSURANCE

- A. Qualifications: Upon request, the curtainwall manufacturer shall provide written confirmation that the installer is authorized to install curtainwall products to be used on this project.
- B. Submit Quality Assurance/Quality Control Program for the manufacture and installation of the curtain wall units, prior to start of work.
- C. Trade contractor shall furnish and install the items required for proper completion of the work without adjustment to the price. Work shall be structurally sound, quality construction and the contractor shall be solely responsible for the inclusion of adequate labor and materials to cover the proper and timely installation of the items indicated, described or implied. This is a performance specification and criteria for the solution of structurally sound work as indicated on the drawings and herein specified for the sole purpose of defining the design intent and performance requirements. The details shown are intended to emphasize the acceptable performance requirements for this project and the general orientation, arrangement and dimensional coordination necessary for the Contractor to fulfill its obligations as described within the executed contract.
- D. Trade contractor shall enact QA/QC program of inspection to verify that their Work meets all their obligations and conforms with approved documents. Trade Contractor shall present evidence that they enact such a program on an on-going basis during fabrication and construction.
- E. Framing members:
  - 1. Glass, sealants and interior finishes shall not be assumed to contribute to framing member strength, stiffness or lateral stability.
  - 2. Compression flanges of flexural members may be assumed to receive effective lateral bracing only from (a) anchors to building structural and (b) horizontal glazing rails or interior trim which contact the compression flange. Points of contra flexure shall not be regarded as lateral braces or as end points of an unbraced length; un-braced length shall be the distance between effective lateral braces.
  - 3. Where a framing member reaction is resisted by a continuous element, maximum assumed effective length of resisting element shall be four times the bearing length, but not more than one-foot.
  - 4. Splice joints, which permit movement, shall be assumed to have zero movement capacity.
  - 5. Where a framing member runs continuously past a deflecting support, combined deflection of member and support shall not exceed specified limits
- F. Stack joint and corner mullions should be sized to accommodate anticipated building movements, thermal movements, and installation tolerances. Design differential floor edge vertical movement between successive floors to comply with structural engineers requirements for the project. Exposed members should have consistent sight lines.
- G. Snap engagement components shall be secured against migration, and shall not serve any primary structural function, such as retention of glass or panels. Provide mechanical fastening of all exterior assemblies, not relying solely on compression friction fit. Snap engaged plastic components are not permitted, except as non-structural thermal improvement for interior trim. Joints in continuous snap covers and other continuous trim shall have splice sleeves of same material and finish as cover or trim.

- H. System should contain gasketed male-female joints and be internally reinforced where required to meet design conditions. Where windows cannot be internally reinforced, additional members should be added to the interior side of the window system and must be consistent throughout the apartment where they exist. Reinforcement should not be added to the exterior of the façade.
- I. Aluminum panels should be fabricated in .125" (minimum). Extruded members and panels shall provide a uniform appearance. Provide stiffeners where required.
- J. All fasteners in wet areas or outboard of the system airseal shall be stainless steel.
- K. All window assemblies and components should contain internal drainage system.
- L. Engineering Judgment for perimeter slab firesafing showing compliance with UL tested assemblies and applicable codes.

# 1.6 DELIVERY, STORAGE AND HANDLING

- A. Packing, Shipping, Handling and Unloading
  - 1. Materials will be packed, loaded, shipped, unloaded, stored and protected in accordance with AAMA CW-10.
- B. Protective film should be provided on trim and panels and removed after trim installation. Windows and components should be stored off the ground and covered until installation. Manufacturers should provide additional handling recommendations and requirements. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations.
- C. Temporary protection should be provided immediately after windows are installed and maintained until substantial completion.

# 1.7 WARRANTY

- A. Aluminum Curtain wall Warranty
  - 1. Products: Submit a written warranty, executed by the curtainwall manufacturer, for a period of five (5) years from the date of manufacture, against defective materials or workmanship, including substantial non-compliance with applicable specification requirements and industry standards, which result in premature failure of the curtainwall, finish, or parts, outside of normal wear.
- B. The overall system shall be warranted for no less than five (5) years, material and labor, including faulty glass replacement. Certain materials and components shall have longer warranties (sealants). The manufacturers shall state the warranties included and any premium to increase warranties if requested by the Owner. System warranty includes materials and labor and is a joint warranty signed by both the manufacturer and the Trade Contractors.
  - 1. In the event that curtain wall or components fail or are found defective, manufacturer will repair or provide replacements without charge at manufacturer's option. Failures include, but are not limited to, the following:
    - a. Structural failures including but not limited to, excessive deflection.
    - b. Noise or vibration caused by thermal movements.
    - c. Failure of system to meet performance requirements.
    - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - e. Chalking and fading of aluminum finishes.
    - f. Failure of operating components to function normally.
    - g. Water leakage.
    - h. Glazing breakage including secondary breakage caused by falling glass, spontaneous breakage of heat-treated glass.
    - i. Cracking, peeling or discoloration of low-E or reflective glass coating.

- j. Glass failure including fogging of units and delamination.
- k. Loss of glass bearing on setting blocks due to shifting of glass and/or blocks.
- 1. Abnormal deterioration, aging or weathering.
- m. Air leakage exceeding specified limits.
- n. Sealant, including structural silicone, ability to withstand loss of adhesion, loss of cohesion, cracking or discoloration.
- o. Disengagements of gaskets or weather-strips.
- p. Collapse of thermal insulation.
- 2. Warranty for all components must be direct from the manufacturer (non-passthrough) and non-pro-rated for the entire term. Warranty must be assignable to the non-residential owner, and transferable to subsequent owners through its length.
- 3. Sealants shall have a 20-year VIP material and labor warranty.
- C. Insulated Glass Unit Warranty: Insulated glass units edge seal shall be warranted for a period of 10 years (Replacement Labor included) and 10 years (Material). The warranty for the glass must include labor and material in the event of "systemic failure".
- D. Aluminum Finish Warranty: Ten (10) years material and labor warranty.
- E. Installation: Submit a written warranty, executed by the curtainwall installer, for a period of five (5) years from the date of substantial completion, against defective materials or workmanship, including substantial non-compliance with applicable specification requirements, which result in premature failure.
  - 1. In the event that installation of curtainwall or components is found to be defective, installer will repair or provide replacements without charge at the installer's option.

### PART 2 PRODUCTS

- 2.1 MANUFACTURERS
  - A. Acceptable Manufacturers
    - 1. Kawneer 1600 UT Series (Basis of Design)
    - 2. Tubelite 400SS Thermal Curtainwall
    - 3. Wausau Window and Wall Systems
    - 4. EFCO
    - 5. Substitutions: Section 01 60 00 Product Requirements.

# 2.2 MATERIALS

- A. Aluminum Framing Members
  - 1. Extruded aluminum billet, 6063-T5 or T6 alloy for primary components; 6063-T5 or T6, 6005-T5, 6105-T5 or 6061-T6 for structural components; all meeting the requirements of ASTM B221.
  - 2. Aluminum sheet alloy 5005-H32 (for anodic finishing), or alloy 3003-H14 (for painted or unfinished sheet) meeting the requirements of ASTM B209.
  - 3. Principal extruded framing members will be a minimum 0.125" in thickness.
  - 4. Extruded or formed trim components will be a minimum 0.060" in thickness.
  - 5. System face width and depth dimensions shall nominally match those shown on architectural drawings.
    - a. Overall depth 7 <sup>1</sup>/<sub>2</sub>" with standard 1" glass setback. Primary mullion split tube depth 5".
    - b. Exterior face dimension  $2\frac{1}{2}$ " at vertical mullions
  - 6. Vertical mullions to be fully captured and/or structural glazed as indicated on architectural drawings.

- 7. Horizontal intermediate framing members to be fully captured and/or structural glazed as indicated on architectural drawings.
- 8. Fasteners and accessories: Provide non-magnetic stainless steel, warranted by manufacturer to be non-corrosive and compatible with aluminum components.
  - a. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, windloads, or vibration.
  - b. Reinforce members as required to receive fastener threads.
  - c. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
  - d. All fasteners exposed to moisture shall be series 300 stainless steel.

# 2.3 COMPONENTS

- A. Sealants
  - 1. All sealants shall comply with applicable provisions of AAMA 800 and/or Federal Specifications FS-TT-001 and 002 Series.
  - 2. Frame joinery sealants shall be suitable for application specified and as tested and approved by curtainwall manufacturer.
  - 3. Sealants (Non-structural):
    - a. All joints, which are sealed with sealant as part of the fabrication or erection procedure, shall be sealed with a high-grade, non-staining, non-bleeding, low modulus silicone (exposed or concealed) sealant in color to match the adjoining surfaces or as may be required by the Architect. All perimeter sealant (metal to adjacent construction) shall be low or medium modulus silicone sealant as manufactured by Momentive or Dow Corning.
    - b. In using specified sealants, strictly observe the printed instructions of sealant manufacturer regarding joint size, limitations, backer rod, mixing, cleaning, surface preparation, priming and application. A primer shall be used, unless printed instructions advise to the contrary, and sealant manufacturer certifies that the use thereof will reduce its performance. Sealant shall not be applied when substrates are wet or when the temperature is below 40 deg F.
    - c. Care shall be exercised to insure against "Three Surface Adhesion". Bond breakers shall be provided where necessary.
    - d. Contractor shall provide certification from sealant manufacturer that the sealant manufacturer has reviewed all sealant details and finds same suitable for the purpose intended, compatible with and will not stain the surfaces with which they are in contact. Statement as to compatibility, adhesion sufficiency and non-staining shall be accompanied by actual test results on production substrates performed in accordance with applicable ASTM procedures.
    - e. Sealant within the systems should be compatible and adhere to silicone. The perimeter sealant, between window system and adjacent material should be high-grade silicone. Manufacturer testing should be performed prior to construction including adhesion, compatibility and stain resistance.
    - f. Sealant back-up materials shall be polyethylene foam or extruded silicone as recommended by sealant manufacturer. Back –up shall not absorb water.
  - 4. Sealants (Structural):
    - a. All components which are adhered with a structural silicone sealant as part of the fabrication, glazing or erection procedure, shall be sealed with an approved structural silicone, as manufactured by Momentive or Dow Corning and approved by the Architect. All glazing with structural silicone sealant shall be accomplished in a shop wherever consistent with the design.

- b. In using specified sealants, strictly observed the printed instructions of sealant manufacturer regarding joints size, limitations, backer rod, mixing, cleaning, surface preparation, priming and application. A primer shall be used, unless printed instructions advise to the contrary. Sealant shall not be applied where substrates are wet, or when the temperature is below 40 deg F. Units shall not be moved until structural silicone has achieved full cure.
- c. Care shall be exercised to insure against "Three Surface Adhesion". Bond breakers shall be provided where necessary.
- d. Contractor shall provide certification from sealant manufacturer that the sealant manufacturer has reviewed all sealant details and tested all contact surfaces, and finds same suitable for use with proposed sealant, the purpose intended and compatible with the surfaces with which they are in contact. Sealant manufacturer's certification shall include the following based upon tests performed on production run materials:
- e. Test data of adhesion to production samples of metal and glass, tested in accordance with ASTM C794.
- f. Compatibility statement that the materials in contact with the sealant such as gaskets, spacers, setting blocks, are compatible with the sealant after 21 days exposure to ultra violet.
- g. Stress statement that when exposed to the specified wind load the stress in the silicone sealant of dimensions shown does not exceed 20 psi with a safety factor of 5:1.
- h. Structural silicone shall not support dead load. Structural silicone shall be free of entrained air and shall have full contact with substrates per GANA standards.
- i. Structural silicone shall not be applied to edges of insulating glass or to edges of laminated glass.
- j. Glass or other infill material shall not be attached by structural silicone on both sides of a frame movement joint.
- B. Glass

- Glass: Clear, insulated double glazed units with Low –E coating, air cavity with metal spacer. Thickness as needed to resist project wind loads and minimize distortion, not less than 1" overall (1/4" exterior lite, 1/2" air cavity, 1/4" interior lite as a baseline, increase thickness as required to meet performance requirements). Air space to have desiccant filled metal (aluminum or stainless steel) spacer with welded, fused, soldered or bent corners and welded, fused or soldered splices or joints to provide a 1/2" hermetically sealed and dehydrated space. Insulating glass shall be dual seal and certified for compliance with seal classification "CBA" by the Insulating Glass Certification Council (IGCC) and tested in accordance with the following ASTM Test methods. Primary seal shall be polyisobutyl (PIB). Secondary seal on structural silicone glazed units shall be a special silicone edge seal certified for use in structural silicone glazing applications over the temperature range and structural loading as called for under the performance criteria section of this Specification. There must be no air entrained in the secondary structural IGU edge seal.
  - a. E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation.
  - b. E 546-88 Standard Test Method for Frost Point of Sealed Insulating Glass Units.
  - c. E 576-88 Standard Test Method for Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.
- C. Glass shall be heat strengthened unless safety glass is required by code or by thermal loads. The glass edge seal shall be provided with a ten (10) year warranty. The warranty for the glass must include labor in the event of a "systemic failure." Solar heat gain coefficient and U-value shall meet requirements established by NYS Energy Code and Energy Model. Refer to architect's drawings for glazing schedule.

- D. Glass shall be of the types and minimum thickness as shown on the drawings and specified herein and shall, in addition, meet the requirements of the following paragraphs.
- E. Vision and spandrel glass shall match, subject to the Architect's approval of visual samples. Glass manufacturers to include Viracon, Interpane, or approved equal.
- F. Tempered/safety glass should be used only where required by code or loads including at end adjacent to doors, within 18 inches of finished floor, and where windows could be mistaken for means of egress.
- G. All tempered glass should be heat soaked or warranted for spontaneous breakage, labor included.
- H. The IGU center deflection relative to glass edges at 50 percent of specified design pressures shall not exceed 1". Glass deflection at 1.5 times design pressures shall be limited to prevent disengagement from frame.
- I. All glazing details shall be reviewed and accepted by the glass manufacturer.
- J. The glass manufacturer shall perform a thermal, stress, compatibility and load analysis.
- K. The glass manufacturer shall review and advise on thermal stresses on glass due to heat build-up from window treatment placement. Window vendors to provide specific instructions for placement of window treatments adjacent to window system.
- L. Primary insulated glass seal, polyisobutylene (PIB), to have a minimum of one-half of the bond width in contact with the deleted glass surface.
- M. Primary insulated glass seal, polyisobutylene (PIB), to be fully compatible with all adjacent substrates and materials.
- N. Glass shall conform to the requirements of ASTM C 1036. Heat strengthened, and tempered glass shall conform to the requirements of ASTM C 1048. Tempered glass shall also conform to ANSI Z97.1-1975. All heat strengthening and tempering shall be by the horizontal process, and processed in such a manner as to have all roller distortion in a horizontal direction as installed on the building.
- O. Edge deletion of Low-E coating shall be performed in a manner that provides complete removal, without residual coating remaining on the glass surface. Coating shall be fully and completely edge deleted to the primary sealant PIB bondline.
- P. Secondary structural sealant within the insulated glass unit (IGU) must be processed in a closed system free from exposure to air.
- Q. When using patterned insulated glass, there may be a potential to see a moiré pattern develop in the glass when viewed in certain light conditions and at specific solar angles. Moiré is an optical phenomenon that may present itself as a "wavy, rippled or circular" pattern under certain conditions. Moiré patterns can be created whenever one semi-transparent object with a repetitive pattern is placed over another. It is recommended that a full-size mock-up be evaluated if patterned glass is being considered. The mock-up should be installed at the building site to better evaluate lighting conditions and be viewed at different times of day under varying temperature conditions.
- R. Optical clarity and flatness shall be judged by the Architect from full-size glass samples and through the sample submission. The visual and performance mock-up shall represent the range of quality to be provided for the project.

- S. Rollerwaves on heat treated glass shall be orientated in the same orientation, parallel to grade. Maximum peak to valley rollerwave shall be 0.003" in the center of the glass and .008" within 14" of the leading and trailing edge of the glass.
- T. Glass observed with visible iridescence or quench marks from the heat treat process shall be rejected and replaced.
- U. Color variation between should not exceed 2 delta-E from the approved sample.
- V. Bow/Warp: In addition to conforming with ASTM C 1048, heat treated glass shall conform to the following flatness tolerance criteria.
  - 1. Bow and warp are defined as deviation of a glass surface from a true plane, with glass freestanding or installed in a frame and positioned in a vertical plane.
  - 2. Localized bow refers to any straight-line segment on a glass surface with length of 12 inches.
  - 3. Overall bow refers to any straight-line segment on a glass surface, which extends between opposite edges and is perpendicular to at least on edge. Length of line segment is gage length.
  - 4. Localized bow shall not exceed 0.0625 inch (1.6 mm).
  - 5. Overall bow shall not exceed 50% of the values listed in ASTM C 1048, Table 2.
- W. Insulated glass units shall be fabricated with aluminum or stainless-steel spacer bars, spliced on straight runs only, maximum of 2 splices per IGU.
- X. Glazing

- 1. Glazing method shall be in general accordance with the GANA Glazing Manual for specified glass type, or as approved by the glass fabricator.
- Y. Glazing Materials
  - Setting Blocks/Edge Blocking: Provide in sizes and locations recommended by GANA Glazing Manual. Setting blocks used in conjunction with soft-coat low-e glass shall be silicone.
    - a. Provide setting blocks at sill quarter points of all glass lites. Setting blocks shall be heat cured silicone rubber with a hardness of 80 to 90 durometer, Shore A, a minimum length of 4" and a minimum width, which will permit full support of both panes of glass in an insulating glass unit or a monolithic unit no matter how positioned within the glazing rabbet. Location of setting blocks at glass quarter points is acceptable. Distance from vertical glass edge to nearest edge of setting block shall not be less than six inches.
    - b. Shims used in conjunction with setting blocks must be of the same materials, hardness, length and width as the setting blocks.
  - 2. Back-bedding tapes, expanded cellular glazing tapes, toe beads, heel beads and cap beads shall meet the requirements of applicable specifications cited in AAMA 800.
  - 3. Glazing gaskets shall be non-shrinking, weather-resistant, and compatible with all materials in contact.
  - 4. Structural silicone sealant where used shall meet the requirements of ASTM C1184.
  - 5. All materials and finishes in contact with structural silicone shall be tested for compatibility and approved by the sealant manufacturer for the intended application.
  - 6. Gaskets in continuous contact with structural silicone shall be extruded silicone or compatible material.
  - 7. Provide extruded aluminum setting block chairs for support of triple insulating glass.

- Z. Steel Components
  - 1. Provide steel reinforcements as necessary to meet the performance requirements of 1.03.
  - 2. Concealed steel anchors and reinforcing shall be factory painted after fabrication with TGIC powder coating, or rust-inhibitive primer complying with Federal Specification TT-P-645B.
  - 3. Anchors: Three-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer. CM to confirm tolerance in building structure.
  - 4. Dissimilar Metal Separation: Separate dissimilar metals with bituminous paint or plastic shims.
  - 5. Bituminous Coatings: Cold-applied asphalt mastic compounded for 30 mil thickness per coat.
  - 6. Strength of embedded anchors shall be developed by integral projections, welded deformed bars, or headed studs.
  - 7. Expansion bolts are acceptable at concrete.
  - 8. Self-drilling, self-threading screws are not acceptable. Screw in plugs and power actuated fasteners are not acceptable.

# 2.4 FABRICATION

- A. General Design and Fabrication Requirements
  - Finish, fabricate and factory assemble curtainwall and window wall under the responsibility of one manufacturer, with units sized for ease of shipping, distribution and erection.
    - a. Systems using individual field fabricated or field assembled members are not acceptable, unless necessitated by shipping, distribution or erection constraints.
  - 2. Framing to be designed for glazing from the exterior.
  - 3. Provide interlocking male/female type vertical mullion "stack" joints at adjacent grid frame members with sharp, well-defined corners and flush sightlines.
  - 4. Conceal fasteners at vertical to horizontal main framing connections and at miscellaneous trim except as shown on architectural drawings or otherwise required.
  - 5. Fabricate to allow for thermal movement of materials when subjected to a Temperature differential from -20 degrees F to +180 degrees F without damage.
  - 6. The curtainwall and window wall system shall be designed to accommodate a total of plus or minus <sup>1</sup>/<sub>4</sub>" inter-story vertical movement, including fabrication tolerance, without damage. Project Structural Engineer to confirm inter-story movements.
  - 7. System to be fully pressure-equalized at the interior plane of the glazing pocket with anchor penetrations and framing connection fasteners located inboard of the primary air seal.
    - a. Glazing pocket at each glass lite shall be compartmentalized.
- B. Glass Drainage
  - 1. Provide weep holes and/or drainage slots within glazing pockets to drain any condensation or accumulating water within the system to exterior.
- C. "Snap-On" Covers
  - 1. Snap-on covers applied to pressure plates shall show a sharp, uninterrupted exterior profile between expansion joints.
    - a. Allow for horizontal thermal expansion in cover and pressure plate joinery.
    - b. Make provision for drainage of snap-on covers.
    - c. Snap-on covers shall conceal pressure plate fasteners.

- 2. Pin, seal, or otherwise secure exterior snap-on covers as necessary to prevent vertical settlement over time.
  - a. Follow manufacturer's instructions for installation of extended covers that may be subject to inadvertent window washer loads.
  - b. Exterior snap trim to be mechanically fastened. Do not rely solely on snap engagement.
- D. Dual Glazed Access Panel
  - 1. Hinged access panel will be constructed with mitered corners, mechanically staked over a solid aluminum corner block leaving hairline joinery.
- E. Thermal Break Construction
  - 1. "Tri-level" framing system thermal isolation to be provided by:
    - a. Rigid cPVC thermal clips separating exterior surfaces from glazing pressure plates.
    - b. Continuous extruded EPDM 70 spacer separating pressure plates and frames.
    - c. Two strips of continuous pultruded 6/6 polyamide nylon with 25% glass fiber reinforcing providing 7/8" thermal separation within glazing pocket.
    - d. Provide sponge neoprene zone dams at framing intersection.
- F. Weather-Stripping
  - 1. Dual durometer PVC, polypropylene, TPE, EPDM, neoprene, silicone, or other suitable material as tested and approved by the curtainwall manufacturer.
  - 2. Weather-stripping installed in integral dovetail races in framing members.
  - 3. One row of fin-type weather-strip at interlocking vertical mullion members to provide isolation for horizontal movement.

### 2.05 FINISHES

- A. Finish of Aluminum Components
  - 1. Finish of all exposed areas of aluminum curtainwall and window wall components shall be done in accord with the appropriate AAMA Voluntary Guide Specification shown.

Designation	Description	Standard	Color
AAM10C21A41	Clear Class I	AAMA 611	Clear
Eco-friendly etch			

### PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Site Verification of Conditions
  - 1. Verify that building substrates permit installation of curtainwall according to the manufacturer's instructions, approved shop drawings, calculations and contract documents.
  - 2. Do not install curtainwall until unsatisfactory conditions are corrected.

### 3.2 INSTALLATION

- A. Erection of Aluminum Curtainwall
  - 1. Install curtainwall with skilled workers in accordance with approved shop drawings, installation instructions, specifications, and the AAMA MCWM-1 "Metal Curtainwall Manual".

#### GLAZED ALUMINUM CURTAINWALL

- 2. Curtainwall must be installed plumb, square and level for proper weathering and operation.
- 3. Aluminum that is not organically coated shall be insulated from direct contact with steel, masonry, concrete or other dissimilar metals by bituminous paint, rust-inhibiting primer, non-conductive shims or other suitable insulating material.
- 4. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint
- 5. Anchorage: After system components are positioned, fix connections to building structure as indicated on Shop Drawings.
  - a. Provide separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
  - b. Provide means for back-off prevention such as lock washer or spot welding. No liquid thread locks shall be permitted.
  - c. Anchor component parts by bolting and welding. Install slip pads between moving parts.
  - d. Where slots or oversized holes are provided for adjustment only, secure connection after final adjustment. Interlocking serrations in extruded aluminum brackets and washers are preferred. Steel weld washers with 0.25-inch minimum thickness are acceptable with steel brackets.
  - e. Remove temporary shims and fasteners. Leave expansion joints free to move as designed.
- 6. Glazing:
  - a. Install glazing according to approved Shop Drawings and approved fieldglazing requirements. Glaze in temperatures above 40 degrees F. Comply with GANA glazing manual.
  - b. Inspect frame for proper dimensions and squareness. Adjust frame and/or glass size as required to meet specified requirements.
  - c. Clean glazing pocket before setting glass. Solvents shall be with finished aluminum, glass and glazing materials. Setting blocks shall be equidistant from glass centerline. Location of setting blocks at glass quarter points is acceptable. Distance from vertical glass edge to nearest edge of setting block shall not be less than six inches.
  - d. Where gasket joints occur, tightly butt ends and seal with compatible sealant. Gasket joints shall not occur at locations other than corners if their use is permitted.
  - e. Inspect glass before installation. Do not install glass which does not conform to specification. Replace glass that is broken or damaged.
  - f. Except as otherwise specified, comply with GANA Glazing Manual.
  - g. Clean, prime and mask structural silicone joints during same day in which silicone is applied.
  - h. Temporarily clamp glass during cure of structural silicone. After sufficient cure, remove clamps and fill gaps in silicone.
  - i. Mask glass and aluminum during application of structural silicone. Remove masking immediately after tooling sealant.
  - j. Structural silicone shall not be applied to edges of insulating glass units, or to edges of laminated glass units. Sealants used as weather seals shall not be placed against edge of laminated glass interlayer.
- 7. Clean surfaces to be sealed. Install backer, primers and sealant according to approved Shop Drawings, sealant test results and manufacturer's recommendations. Tool sealant after application. Immediately remove masking. Comply with requirements of Section 079200, "Joint Sealants."
- 8. Install firesafing in locations indicated. Comply with requirements of Section 078413, "Firestops and Smokeseals." And Engineering Judgments.
- 9. Erection Tolerances: Install glazed aluminum curtain wall system to comply with the following maximum tolerances:
  - a. Plumb: 1/16 inch in 10 feet; 1/8 inch in 40 feet.
  - b. Level: 1/16 inch in 20 feet; 1/8 inch in 40 feet.
  - c. Alignment: Where surfaces about in line, limit offset from true alignment to 1/16 inch; where a reveal or protruding element separates aligned surfaces by less than 2 inches, limit offset to 1/4 inch.
  - d. Location: Limit variation from plane or location shown on Shop Drawings to 1/8 inch in 12 feet; 1/4 inch over total length.

# END OF SECTION

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# SECTION 08 71 00

# DOOR HARDWARE

#### PART 1 - GENERAL

# 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
  - 1. Swinging doors.
  - 2. Sliding doors.
  - 3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Electromechanical door hardware.
  - 3. Cylinders specified for doors in other sections.
- C. Related Sections:
  - 1. Section 08 06 71 Door Hardware Sets
  - 2. Section 08 11 13 Hollow Metal Frames
  - 3. Section 08 21 00 Flush Wood Doors
  - 4. Section 08 41 00 Aluminum Framed Storefronts
  - 5. Section 28 13 00 Access Control
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC International Building Code.
  - 3. NFPA 70 National Electrical Code.
  - 4. NFPA 80 Fire Doors and Windows.
  - 5. NFPA 101 Life Safety Code.
  - 6. NFPA 105 Installation of Smoke Door Assemblies.
  - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards:
  - 1. ANSI/BHMA Certified Product Standards A156 Series
  - 2. UL10C Positive Pressure Fire Tests of Door Assemblies

# 1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  - 3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Warranty information for each product.
  - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
  - 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
    - a. Elevation diagram of each unique access-controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
    - b. Complete (risers, point-to-point) access control system block wiring diagrams.
    - c. Wiring instructions for each electronic component scheduled herein.
  - 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
  - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.
- 1.4 QUALITY ASSURANCE
  - A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
  - B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
  - C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
  - D. Integrated Wiegand, Wireless, and IP-Enabled Access Control Products Supplier Qualifications: Integrated access control products and accessories are required to be supplied and installed through current members of the ASSA ABLOY "Authorized Channel Partner" (ACP) and "Certified Integrator" (CI) programs. Suppliers are to be factory trained, certified prior to project bid, and a direct purchaser of the specified product. Installers are to be factory trained, certified prior to project bid, and are responsible for commissioning, servicing, and warranting the installed equipment specified for the project.
  - E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
    - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third-party source will not be accepted.
    - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
  - F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
  - G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
    - 1. Function of building, purpose of each area and degree of security required.
    - 2. Plans for existing and future key system expansion.
    - 3. Requirements for key control storage and software.
    - 4. Installation of permanent keys, cylinder cores and software.
    - 5. Address and requirements for delivery of keys.
  - H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s),

Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

- 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
- 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
- 3. Review sequence of operation narratives for each unique access-controlled opening.
- 4. Review and finalize construction schedule and verify availability of materials.
- 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

# 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

# 1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

# 1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of the hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
  - 1. Ten years for mortise locks and latches.
  - 2. Five years for exit hardware.
  - 3. Twenty-five years for manual surface door closer bodies.
  - 4. Two years for electromechanical door hardware.

#### 1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

#### PART 2 - PRODUCTS

# 2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
  - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

# 2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
  - 1. Quantity: Provide the following hinge quantity:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.

- d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
- 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
  - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
  - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
- 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
  - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
  - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
- 4. Hinge Options: Comply with the following:
  - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
- 5. Manufacturers:
  - a. Bommer Industries (BO).
  - b. Lawrence Brothers (LA).
  - c. McKinney Products (MK).
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut- outs.
  - 1. Manufacturers:
    - a. Markar Products (MR).
    - b. McKinney Products (MK).
    - c. Pemko Products (PE).

# 2.3 POWER TRANSFER DEVICES

- A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex<sup>™</sup> standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
  - 1. Manufacturers:
    - a. Bommer Industries (BO) (# wires) Option.
    - b. Lawrence Brothers (LA) (# wires) Option.
    - c. McKinney Products (MK) QC (# wires) Option.
- B. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex<sup>TM</sup> standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
  - 1. Manufacturers:
    - a. Architectural Builders Hardware (AH) PT1000-EZ Series.
    - b. Pemko Products (PE) EL-CEPT Series.
    - c. Securitron (SU) EL-CEPT Series.

- C. Electrified Quick Connect Data Transfer Hinges: Provide combined electrified power and Ethernet data transfer hinges with Molex<sup>™</sup> standardized plug connectors to accommodate Electrified Quick Connect Data Transfer Hinges: Provide combined electrified power and Ethernet data transfer hinges with Molex<sup>™</sup> standardized plug connectors to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
  - 1. Data transfer hinges feature two 6-position and two 4-position Molex connectors, 9 multistrand wires; 2 twisted pairs (26 AWG), 4 straight conductors (28 gauge) and 1 straight conductor (22 AWG) with concealed plug connectors eliminating the need for separate or exposed wiring. Rated 350 mA continuous @ 48 volts DC nominal, the hinge is capable of two PoE wiring configurations:
    - a. Power over Data (5 wire): Power and Data supplied together over the 2 twisted 26 AWG) pairs. The 22 AWG conductor is used for the earth ground connection.
    - b. Data with Power over Spares (9 wire): Data over 2 twisted (26 AWG) pairs with Power over spare pairs 94 straight 28 AWG conductors). The 22 Awg conductor is used for earth ground connection.
  - 2. Manufacturers:
    - a. Bommer Industries (BO) PoE Series.
    - b. Lawrence Brothers (LA) PoE Series.
    - c. McKinney Products (MK) PoE Series.
- D. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
  - 1. Provide one each of the following tools as part of the base bid contract:
    - a. McKinney Products (MK) Electrical Connecting Kit: QC-R001.
    - b. McKinney Products (MK) Connector Hand Tool: QC-R003.
  - 2. Manufacturers:
    - a. McKinney Products (MK) QC-C Series.
    - b. McKinney Products (MK) PoE Series.
- E. Provide mortar guard enclosure on steel frames installed at masonry openings for each electrical hinge specified.

# 2.4 DOOR OPERATING TRIM

- A. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
  - 1. Push/Pull Plates: Minimum .050-inch-thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
  - 2. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
  - 3. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
  - 4. Manufacturers:

- a. Hiawatha, Inc. (HI).
- b. Rockwood Products (RO).
- c. Trimco (TC).

# 2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years' experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
  - 1. Manufacturers:
    - a. Corbin Russwin Hardware (RU).
    - b. To Meet Owners Requirements.
- C. Cylinders: Original manufacturer cylinders complying with the following:
  - 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
  - 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  - 3. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  - 4. Keyway: Match Facility Standard.
- D. High Security Cylinders: ANSI/BHMA A156.5, Grade 1, patterned high security cylinders and keys able to be used together under the same facility master or grandmaster key system. Provide UL437 certified high security cylinders, employing a patterned locking mechanism requiring the use of a patterned key and pick resistance; cylinders are to be factory keyed.
  - 1. Manufacturers:
    - a. Corbin Russwin (RU) Pyramid PHS Series.
- E. Keying System: Each type of lock and cylinders to be factory keyed.
  - 1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
  - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
  - 3. Existing System: Key locks to Owner's existing Corbin Russwin Pyramid system.
- F. Key Quantity: Provide the following minimum number of keys:
  - 1. Change Keys per Cylinder: Three (3) each.
  - 2. Master Keys (per Master Key Level/Group): Five (5) each.
  - 3. Construction Keys: Ten (10) each.
- G. Construction Keying: Provide construction master keyed cylinders.
- H. Key Registration List (Bitting List):
  - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
  - 2. Provide transcript list in writing or electronic file as directed by the Owner.

#### 2.6 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
  - 1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) ML2000 Series.
    - b. To Meet Owners Requirements.

# 2.7 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
  - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
  - 2. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
- B. Standards: Comply with the following:
  - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.

#### 2.8 ELECTRIC STRIKES

- A. Standard Electric Strikes: Heavy duty, cylindrical and mortise lock electric strikes conforming to ANSI/BHMA A156.31, Grade 1, UL listed for both Burglary Resistance and for use on fire rated door assemblies. Stainless steel construction with dual interlocking plunger design tested to exceed 3000 lbs. of static strength and 350 ft-lbs. of dynamic strength. Strikes tested for a minimum 1 million operating cycles. Provide strikes with 12 or 24 VDC capability and supplied standard as fail-secure unless otherwise specified. Provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike where specified.
  - 1. Manufacturers:
    - a. Folger Adam EDC (FO).
    - b. HES (HS).
    - c. Security Door Controls (SD).
- B. Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike with the combined products having a five-year warranty.

#### 2.9 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
  - 1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
  - 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.

- 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
- 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
- 5. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
- 6. Electromechanical Options: Subject to same compliance standards and requirements as mechanical exit devices, electrified devices to be of type and design as specified in hardware sets. Include any specific controllers when conventional power supplies are not sufficient to provide the proper inrush current.
- 7. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy-duty escutcheon trim with threaded studs for thru-bolts.
  - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
  - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
- 8. Extended cycle test: Devices to have been cycle tested in ordinance with ANSI/BHMA 156.3 requirements to 9 million cycles.
- 9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
  - 1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) ED5000 Series.
    - b. Sargent Manufacturing (SA) 80 Series.
    - c. Yale Locks and Hardware (YA) 7000 Series.

# 2.10 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
  - 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
  - 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
  - 3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
  - 4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
  - 5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
  - 6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
  - 7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

- B. Exterior Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one-piece cast-iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.
  - 1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) DC8000 Series.
    - b. Norton Door Controls (NO) 9500 Series.
    - c. Sargent Manufacturing (SA) 281 Series.
- C. Interior Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one-piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
  - 1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) DC6000 Series.
    - b. Norton Door Controls (NO) 7500 Series.
    - c. Sargent Manufacturing (SA) 351 Series.
- D. Interior Door Closers, Surface Mounted (Cam Action): ANSI/BHMA 156.4, Grade 1 certified surface mounted, high efficiency door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be of the cam and roller design, one-piece cast aluminum silicon alloy body with adjustable backcheck and independently controlled valves for closing sweep and latch speed.
  Manufacturers:
  - a. Corbin Russwin (RU) DC5000 Series.
    - b. Norton Door Controls (NO) 2800ST Series.
    - c. Sargent Manufacturing (SA) 422 Series.

# 2.11 ARCHITECTURAL TRIM

- A. Door Protective Trim
  - 1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
  - 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
  - 3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
  - 4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
    - a. Stainless Steel: 300 grade, 050-inch thick.
  - 5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
  - 6. Manufacturers:
    - a. Hiawatha, Inc. (HI).
    - b. Rockwood Products (RO).

c. Trimco (TC).

# 2.12 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
  - 1. Manufacturers:
    - a. Hiawatha, Inc. (HI).
    - b. Rockwood Products (RO).
    - c. Trimco (TC).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function. 1. Manufacturers:
  - a. Rixson Door Controls (RF).
  - b. Rockwood Products (RO).
  - c. Sargent Manufacturing (SA).

# 2.13 ARCHITECTURAL SEALS

- A. General: Thresholds, weather-stripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
  - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
  - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

- F. Manufacturers:
  - 1. National Guard Products (NG).
  - 2. Pemko Products (PE).
  - 3. Reese Enterprises, Inc. (RE).

# 2.14 ELECTRONIC ACCESSORIES

- A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
  - 1. Manufacturers:
    - a. Sargent Manufacturing (SA) 3280 Series.
    - b. Security Door Controls (SD) DPS Series.
    - c. Securitron (SU) DPS Series.
- B. Switching Power Supplies: Provide switching power supplies that are dual voltage, UL listed, supervised units. Units shall be field selectable with a dedicated battery charging circuit that provide 4 Amp at 12VDC or 24VDC continuous, with up to 16 independently controlled power limited outputs. Units shall tolerate brownout or overvoltage input  $\pm$  15% of nominal voltage and have thermal shutdown protection with auto restart. Circuit breaker shall protect against overcurrent and reverse battery faults and units shall be available with a single relay fire trigger or individually triggered relayed outputs. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
  - 1. Manufacturers:
    - a. Securitron (SU) AQ Series.

#### 2.15 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

#### 2.16 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

# 2.17 EXISTING HARDWARE

A. All hardware for doors listed as existing to remain in the door schedule or in the hardware sets will remain. The general contractor shall clean and adjust these items for proper alignment and operation.

#### **DOOR HARDWARE**

#### 2.18 EXISTING HARDWARE PREPS

A. The general contractor shall verify that all new hardware specified for existing doors and frames will be compatible with the existing hardware preparations and conditions. Lack of verification prior to bid, that requires additional work to the existing doors and frames or additional material, will be the responsibility of the general contractor.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

# 3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

#### 3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
  - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
  - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

# 3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

# 3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

# 3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

# 3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

#### 3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.
- C. Refer to Section 08 06 71 Door Hardware Sets for hardware sets.

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#### SECTION 08 80 00 GLAZING

#### PART 1 GENERAL

#### 1.1 SUMMARY

A. Section includes glazing products, including those specified in other Sections where glazing requirements are specified by reference to this Section as required by Contract Documents.

#### 1.2 DEFINITIONS

- A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.
- D. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
  - 1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
    - a. Design Wind Loads: Determine design wind loads applicable to project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Contract Drawings.
    - b. Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
      - 1) For monolithic-glass lites heat treated to resist wind loads.
      - 2) For insulating glass.

- C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
  - 1. For monolithic-glass lites, properties are based on units with lites 1/4 inch thick.
  - 2. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
    - a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F.
    - b. Solar Heat Gain Coefficient: NFRC 200.
    - c. Solar Optical Properties: NFRC 300.

# 1.4 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated including performance data for glass.
- B. Samples: For the following products, in the form of 12-inch- square Samples for glass.
  - 1. Each color of float glass.
  - 2. Wired glass.
  - 3. Insulating glass for each designation indicated.
- C. Glazing Schedule: Use same designations indicated on Contract Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
- D. Generally, retain paragraph and subparagraph below unless types of glass selected do not require labeling by authorities having jurisdiction or if certification is required as well as labels. See Evaluations.
- E. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
  - 1. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.
- F. Warranties: Special warranties specified in this Section.

# 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this project; whose work has resulted in glass installations with a record of successful in-service performance.
- B. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float and insulating glass.
- C. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.
- D. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

- E. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.
  - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
  - 2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.
- F. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: GANA's "Glazing Manual."
  - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
- G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:
  - 1. Insulating Glass Certification Council.

# 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

# 1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

#### 1.8 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to the Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project Site, within specified warranty period indicated below.
  1. Warranty Period: 5 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to the Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project Site, within specified warranty period indicated below.
  1. Warranty Period: 10 years from date of Substantial Completion.

#### PART 2 PRODUCTS

# 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, manufacturers specified.

#### 2.2 GLASS PRODUCTS

- A. Type GL-1: Insulated Exterior Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.
  - 1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
  - 2. Provide King FT (fully tempered) glass lites where safety glass is indicated.
  - 3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
  - 4. Sealing System: Dual seal, with primary and secondary sealants as follows: a. Manufacturer's standard sealants.
  - 5. Spacer Specifications: Manufacturer's standard spacer material and construction.
- B. Type GL-2: Insulated Exterior Glass Units (Tempered), General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.
  - 1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
  - 2. Provide King FT (fully tempered) glass lites where safety glass is indicated.
  - 3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
  - 4. Sealing System: Dual seal, with primary and secondary sealants as follows: a. Manufacturer's standard sealants.
  - 5. Spacer Specifications: Manufacturer's standard spacer material and construction.
- C. Type GL-3: Insulated Exterior Glass Units (Spandrel); similar to Types GL-1 and GL-2 with outer lite of <sup>1</sup>/<sub>4</sub>" spandrel coated glazing. Color as selected by Owner/Architect from manufacturer's full range.
- D. Type GL-4: NOT USED
- E. Type GL-5: NOT USED
- F. Type GL-6: Safety Glass Clear; fully tempered; conforming to ANSI A97.1 and CPSC 95CRF (1201); <sup>1</sup>/<sub>4</sub> inch thick minimum.
- G. Type GL-6A: Safety Glass Clear; fully tempered; conforming to ANSI A97.1 and CPSC 95CRF (1201); <sup>1</sup>/<sub>2</sub> inch thick minimum.

- H. Type GL-7: Safety Glass Frosted; fully tempered; conforming to ANSI A97.1 and CPSC 95CRF (1201); <sup>1</sup>/<sub>4</sub> inch thick minimum.
- I. Type GL-8: NOT USED
- J. Type GL-9: NOT USED
- K. Type GL-10: <sup>1</sup>/<sub>2</sub>" Laminated Safety Glass Two lites of clear annealed glass, <sup>1</sup>/<sub>4</sub>" thick with clear 0.030" Saflex interlayer by Solutia. Laminate shall comply with CPSC 16 CFR 1201 Category I and Safety Glazing Test Standard and ANSI A-97.1-1984. Minimum standards specified in ASTM C1036-85 or C1048-85.

# 2.3 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
  - 1. Neoprene, ASTM C 864.
  - 2. EPDM, ASTM C 864.
  - 3. Silicone, ASTM C 1115.
  - 4. Thermoplastic polyolefin rubber, ASTM C 1115.
  - 5. Any material indicated above.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
  - 1. Neoprene.
  - 2. EPDM.
  - 3. Silicone.
  - 4. Thermoplastic polyolefin rubber.
  - 5. Any material indicated above.
- C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

#### 2.4 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  - 1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

# 2.5 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

# 2.6 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze openings indicated for project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with outdoor and indoor faces.
- C. Grind smooth and polish exposed glass edges and corners.

# 2.7 MONOLITHIC FLOAT-GLASS UNITS

- A. Uncoated Clear Float-Glass Units: Class 1 (clear) annealed or Kind HS (heat-strengthened) float glass where heat strengthening is required to resist thermal stresses induced by differential shading of individual glass lites and to comply with system performance requirements.
  - 1. Thickness:  $\frac{1}{4}$ " thick minimum.

# 2.8 MONOLITHIC WIRED-GLASS UNITS

- A. Polished Wired-Glass Units (Type G-14): Form 1 (wired glass, polished both sides), Quality-Q6, Mesh 1 (Diamond), 1/4 inch thick.
  - 1. Available Manufacturers:
    - a. Asahi/AMA Glass Corp.; affiliated with AFG Industries, Inc.
    - b. Central Glass Co., Ltd.; distributed by Northwestern Industries Inc.
    - c. Pilkington Sales (North America) Ltd.
    - d. Substitutions: Or approved equal.

# 2.9 INSULATING-GLASS UNITS

- A. Tinted Insulating-Glass Units (Types GL-1 & GL-2):
  - 1. Acceptable Manufactures:
    - a. PPG Solarban 70XL Atlantica (Basis of Design).
    - b. Oldcastle.
    - c. Guardian.
    - d. Pilkington.
    - e. Substitutions: Or approved equal.
  - 2. Overall Unit Thickness and Thickness of Each Lite: 1/4-inch minimum individual glass lite thickness with an overall unit thickness of 1 inch.
  - 3. Interspace Content: Air or Argon.
  - 4. Outdoor Lite: Class 1 float glass.
  - 5. Indoor Lite: Class 1 (clear) float glass.
    - a. Kind HS (heat strengthened).
  - 6. Low-E Coating: Pyrolytic or sputtered on second or third surface.
  - 7. Visible Light Transmittance: 450 percent minimum.
  - 8. Summer Daytime U-Factor: 0.26 maximum.
  - 9. Solar Heat Gain Coefficient: 0.24 maximum.
  - 10. Shading Coefficient: 0.28 minimum.
  - 11. Ultra Violet: 2 percent.

#### 2.10 SAFETY GLASS (Type G-6)

A. 1/4" Safety Glass (G-6): heat strengthened clear safety glass.

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
  - Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep system.
  - 3. Minimum required face or edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- 3.3 GLAZING, GENERAL
  - A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
  - B. Glazing channel dimensions, as indicated on Contract Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
  - C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project Site and legally dispose of off Project Site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
  - D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
  - E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
  - F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
  - G. Provide spacers for glass lites where length plus width is larger than 50 inches as follows:
    - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
    - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

#### 3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

# 3.5 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Install gaskets so they protrude past face of glazing stops.

#### 3.6 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system, unless otherwise indicated.

# 3.7 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

# END OF SECTION

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# SECTION 09 11 10

# METAL STUD FRAMING SYSTEM

# PART 1 GENERAL

# 1.1 SECTION INCLUDES

- A. Formed metal stud framing at interior locations.
- B. Framing accessories.

# 1.2 RELATED SECTIONS

- A. Section 06 11 40 Wood blocking and Curbing: Framing, sheathing and rough wood blocking.
- B. Section 07 21 00 Thermal Insulation.
- C. Section 07 90 00 Joint Protection.
- D. Section 09 26 00 Gypsum Board Systems: Metal studs for partitioning.

# 1.3 REFERENCES

- A. ASTM A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- B. ASTM A653/A653M-08 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- C. ASTM A924 Steel Sheet, Cold-Rolled, Electrolytic Zinc-Coated.
- D. ASTM A1003 Standard Specification for Sheet Steel, Carbon, Metallic and Nonmetallic-Coated for Cold-Formed Framing Members.
- E. ASTM C645 Non-Load (Axial) Bearing Steel Studs, Runners (Track) and Rigid Furring Channels for Screw Application of Gypsum Board.
- F. ASTM C754 Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board.
- G. GA 203 Installation of Screw-Type Steel Framing Members to Receive Gypsum Board.
- H. Metal Framing Manufacturers Association (MFMA) Guidelines for the Use of Metal Framing.
- I. SSPC (Steel Structures Painting Council) Steel Structures Painting Manual.

#### 1.4 SYSTEM DESCRIPTION

- A. Metal stud framing system for interior walls, with batt type acoustic insulation specified in Section 07 21 00, and interior gypsum board specified in Section 09 26 00.
- B. Design and size components to withstand dead and live loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with code.
- C. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

# METAL STUD FRAMING SYSTEM

#### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate component details, anchorage to structure, type and location of fasteners, and accessories or items required of other related work.
- C. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement to framing connections.
- D. Product Data: Provide data describing standard framing member materials and finish, product criteria, load charts, and limitations.
- E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

#### 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with GA 203 and ASTM C754.
- B. Maintain one copy of each document on site.

#### 1.7 QUALIFICATIONS

- A. Installer: Company specializing in performing the work of this section with minimum five years documented experience.
- 1.8 COORDINATION
  - A. Coordinate work under provisions of Section 01 31 00.
  - B. Coordinate with the placement of components within the stud framing system, specified in Section 06 11 40 and Divisions 22, 23, 26, 27, and 28.

#### PART 2 PRODUCTS

# 2.1 STUD FRAMING MATERIALS

- A. Studs: Meeting requirements of ASTM C645; C-Channel, roll-formed from hot-dipped galvanized steel; complying with ASTM A1003 and ASTM A653 G40 or equivalent corrosion resistant coating, depth as detailed:
  - 1. Subject to compliance with requirements, provide ClarkDietrich ProSTUD Framing (20gauge equivalent).
    - a. ClarkDietrich ProSTUD Fire rated partitions to be installed in accordance with UL V450, V438, or V419.
  - 2. Thickness: Interior 20 gauge.
- B. Runners: Of same material and thickness as studs.
- C. Deflection Track Slotted: Manufacturer's single, deep-leg, U-shaped steel track: punched with vertical slots in both legs. Steel Sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection from structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
  - 1. Subject to compliance with requirements, provide: ClarkDietrich MaxTrak or BlazeFrame Slotted Deflection Track or equivalent.

- D. Channel Bridging or Bracing: U-Channel Assembly; Base metal thickness of .0538 inch and minimum <sup>1</sup>/<sub>2</sub> inch wide flanges.
  - 1. Subject to compliance with requirements, provide ClarkDietrich Spazzer 9200 Bridging and Bracing Bar.
  - 2. U-Channel Assembly: 1 <sup>1</sup>/<sub>2</sub> inches
    - a. ClarkDietrich Metal Framing; Easy Clip U-Series Clip Angle or equivalent.
- E. Furring and Bracing Members: Of same material as studs; thickness to suit purpose.
- F. Fasteners: GA 203. Self-drilling, self-tapping screws.
- G. Sheet Metal Backing: 18 gage galvanized steel for reinforcement.
- H. Anchorage Devices: Power actuated. Drilled expansion bolts. Screws with sleeves.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic zincrich.

# 2.2 FABRICATION

- A. Fabricate assemblies to sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.
- B. Fit and assemble in largest practical sections for delivery to site, ready for installation.

#### 2.3 FINISHES

- A. Studs and Track: Galvanize to G60 (minimum) coating class.
- B. Headers: Galvanize to G60 coating class.
- C. Accessories: Same finish as framing members. ASTM A123, hot dip galvanized to 1.25 oz/sq. ft.

#### PART 3 EXECUTION

- 3.1 EXAMINATION
  - A. Verify site conditions under provisions of Section 01 31 00.
  - B. Verify that conditions are ready to receive work.
  - C. Verify that rough-in utilities are in proper location.

#### 3.2 ERECTION

- A. Installation Standard: Comply with ASTM C 754
- B. Align and secure top and bottom runners at 24 inches oc.
- C. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- D. Install studs vertically at 16 inches oc.
- E. Align stud web openings horizontally.
- F. Secure studs to tracks using crimping method. Do not weld.

#### METAL STUD FRAMING SYSTEM

- G. Stud splicing not permissible.
- H. Fabricate corners using a minimum of three studs.
- I. Double stud at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings.
- J. Brace stud framing system rigid.
- K. Coordinate erection of studs with requirements of door frames, window frames, and markerboards, chalkboards and tackboards; install supports and attachments.
- L. Coordinate installation of wood bucks, anchors, and wood blocking with electrical and mechanical work to be placed within or behind stud framing.
- M. Blocking: Secure wood blocking to studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and chalkboards, markerboards and tackboards.
- N. Refer to Drawings for indication of partitions extending to finished ceiling only and for partitions extending through the ceiling to the structure above. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceilingrunners.
- O. Coordinate placement of insulation in stud spaces made inaccessible after stud framingerection.

# END OF SECTION

# SECTION 09 26 00 GYPSUM BOARD SYSTEMS

#### PART 1 GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Interior gypsum board.
  - 2. Tile backing panels.

#### 1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

#### 1.3 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

#### 1.4 STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

#### 1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

# PART 2 PRODUCTS

#### 2.1 PANELS, GENERAL

A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

# 2.2 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - G-P Gypsum. a.
  - b. Lafarge North America Inc.
  - National Gypsum Company. c.
  - d. USG Corporation.
- Β. Regular Type:
  - Thickness: 5/8 inch. 1.
  - 2. Long Edges: Tapered.
  - 3. Not used.
- C. Type X:
  - Thickness: 5/8 inch. 1.
  - 2. Long Edges: Tapered.
  - Standard unless noted otherwise. 3.
- D. Ceiling Type: Manufactured to have more sag resistance than regular-type gypsum board.
  - 1. Thickness: 5/8 inch.
  - 2. Long Edges: Tapered.
  - Typical at ceilings. 3.
- E. Abuse-Resistant Type: Manufactured to produce greater resistance to surface indentation, through-penetration (impact resistance), and abrasion than standard, regular-type and Type X gypsum board.
  - 1. Core: Type X.
  - Long Edges: Tapered. 2.
  - 3. Not used.
- F. High-Impact Type: Manufactured with Type X core, plastic film laminated to back side for greater resistance to through-penetration (impact resistance).
  - Core: 5/8 inch thick. 1
  - 2. Plastic-Film Thickness: 0.010 inch.
  - 3. Not used.
- G. Moisture- and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces.
  - Core: 5/8-inch. Type X. 1.
  - 2. Long Edges: Tapered.
  - 3. All bathrooms and wet areas.

#### 2.3 TILE BACKING PANELS

- Glass-Mat, Water-Resistant Backing Board: A.
  - Complying with ASTM C 1178/C 1178M. 1.
    - Product: Subject to compliance with requirements, provide "DensShield a. Tile Guard" by G-P Gypsum. Complying with ASTM C1177/C 1177M.
  - 2.
    - Product: Subject to compliance with requirements, provide "DensArmor a. Plus Interior Guard" by G-P Gypsum.
  - 3. Core: 5/8-inch, Type X.
  - 4. At all locations receiving tile.

#### 2.4 TRIM ACCESSORIES

Interior Trim: ASTM C 1047. A.

- 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
- 2. Shapes:
  - a. Cornerbead.
  - b. Bullnose bead.
  - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
  - d. L-Bead: L-shaped; exposed long flange receives joint compound.
  - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
  - f. Expansion (control) joint.
  - g. Curved-Edge Cornerbead: With notched or flexible flanges.
- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Fry Reglet Corp.
    - b. Gordon, Inc.
    - c. Pittcon Industries.
  - 2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
  - 3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

# 2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
  - 1. Interior Gypsum Wallboard: Paper.
  - 2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
  - 3. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
  - 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
  - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
  - 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels:
  - 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
  - 2. Cementitious Backer Units: As recommended by backer unit manufacturer.

# 2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
  - 1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
  - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Acoustical Sealant: As specified in Section 07 90 00 Joint Protection.
- E. Thermal Insulation: As specified in Section 07 21 00 Board Insulation.

# PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off soundflanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

## 3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly and minimize end joints.
    - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
  - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
  - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- B. Multilayer Application:
  - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
  - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
  - 3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
  - 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- C. Curved Surfaces:
  - 1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch long straight sections at ends of curves and tangent to them.
  - 2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

## 3.4 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports.
  - 1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.
  - 2. Fasten with corrosion-resistant screws.

#### 3.5 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panel: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile and where indicated. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- C. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

## 3.6 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Professional for visual effect.
- C. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners, unless otherwise indicated.
  - 2. U-Bead: Use at exposed panel edges.
  - 3. Curved-Edge Cornerbead: Use at curved openings.
- D. Aluminum Trim: Install in locations indicated on Drawings.

#### 3.7 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Provide the following level of finish in accordance with the Gypsum Construction Handbook Latest Edition.
  - 1. Level of Finish Schedule:
    - a. Level 0 Temporary Construction.
    - b. Level 1 Plenum areas above ceilings or areas not exposed to view.
    - c. Level 2 WR Gypsum backing board being used for tile substrate.
    - d. Level 3 Gypsum board scheduled to relieve heavy textured finishes or commercial grade wall coverings.
    - e. Level 4 Gypsum board scheduled to receive light textured finishes or residential grade wall coverings.
    - f. Level 5 All gypsum board scheduled to receive paint finish.
- E. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

## 3.8 **PROTECTION**

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - Indications that panels are wet, or moisture damaged include, but are not limited 1. to, discoloration, sagging, or irregular shape. Indications that panels are mold damaged include, but are not limited to, fuzzy or
  - 2. splotchy surface contamination and discoloration.

## END OF SECTION

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## SECTION 09 30 00 TILING

#### PART 1 GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Porcelain tile.
  - 2. Ceramic tile.
  - 3. Marble thresholds.
  - 4. Crack-suppression membrane for thin-set tile installations.
  - 5. Metal edge strips installed as part of tile installations.

#### 1.2 DEFINITIONS

- A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.
- B. Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499).
- C. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
  - 1. Level Surfaces: Minimum 0.6.
  - 2. Step Treads: Minimum 0.6.
  - 3. Ramp Surfaces: Minimum 0.8.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.
- D. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- E. Product Certificates: For each type of product, signed by product manufacturer.
- F. Qualification Data: For Installer.

## 1.5 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain all tile of same type from one source or producer.
  - 1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
  - 1. Stone thresholds.
  - 2. Joint sealants.
  - 3. Metal edge strips.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.
- D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

#### 1.7 **PROJECT CONDITIONS**

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

## 1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

#### PART 2 PRODUCTS

- 2.1 MANUFACTURERS
  - A. As indicated in Part 2.
  - B. Substitutions: Under provisions of Section 01 60 00.

#### 2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
  - 2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
  - 1. As selected by Professional from manufacturer's full range.
- C. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

#### 2.3 TILE PRODUCTS

- A. Ceramic Tile:
  - 1. Type W6
    - a. Manufacturer: Datile
    - b. Product: Elevare Glazed Ceramic
    - c. Size: 6" x 18" x 5/16"

#### B. Porcelain Tile:

- 1. Type F2
  - a. Manufacturer: Datile
  - b. Product: Formula Unpolished
  - c. Size: 12" x 24" x 7/16"
- 2. Type W2
  - a. Manufacturer: Daltile
  - b. Product: Marble Attache Satin
  - c. Size: 12" x 24" x 3/8"
- 3. Type F1 (A & B See drawings)
  - a. Manufacturer: Atlas Concorde
  - b. Product: Marvel Gems Matt
  - c. Size: 18" x 36" x 3/8"
- C. Tile Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with following requirements:

- 1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
- 2. Shapes: As follows, selected from manufacturer's standard shapes:
  - a. Base: Coved.
  - b. Wainscot Cap for Thinset Mortar Installations: Surface bullnose.
  - c. External Corners for Thinset Installations: Surface bullnose.
  - d. Internal Corners: Field-butted square corners, except use coved base and cap angle pieces designed to member with stretcher shapes.
- D. Accessories for Glazed Wall Tile: Provide vitreous china accessories of type and size indicated, in color and finish to match adjoining wall tile, and intended for installing by same method as adjoining wall tile.

## 2.4 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
  - 1. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.
- B. Marble Thresholds: ASTM C 503 with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish.
  - 1. Description: Uniform, fine- to medium-grained white stone with gray veining.

## 2.5 CRACK-SUPPRESSION MEMBRANES FOR THIN-SET TILE INSTALLATIONS

- A. General: Manufacturer's standard product that complies with ANSI A118.10, selected from the following.
- B. Chlorinated-Polyethylene-Sheet Product: Nonplasticized, chlorinated polyethylene faced on both sides with high-strength, nonwoven polyester fabric, for adhering to latex- Portland cement mortar; 60 inches wide by 0.030-inch nominal thickness.
  - 1. Available Product: Noble Company (The); Nobleseal TS.

## 2.6 SETTING AND GROUTING MATERIALS

- A. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.
  - 1. For wall applications, provide nonaging mortar that complies with Paragraph C-4.6.1 in addition to the other requirements in ANSI A118.1.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
  - 1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
  - 2. Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadienerubber liquid-latex additive.
    - a. For wall applications, provide nonaging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.
- C. Polymer-Enriched Mortar Medium Bed and Thinnest (Tiles over 15"): ANIS A118.4 and A118.1 consisting of the following: (Equal to Mapei Ultraflex LFT)
  - 1. Polymer-enriched for high performance and deformability.
  - 2. Non-sag formula for large-format tile and stone in wall applications.
  - 3. Non-slump for large-format tile and stone in floor applications. Can be used as a medium bed up to 3/4" thick.
  - 4. Smooth and creamy consistency makes it easy to apply.

- 5. Low-Dust Technology reduces dust by 90%, resulting in a cleaner and healthier application.
- D. Standard Sanded Cement Grout: ANSI A118.6, color as indicated.
- E. Standard Unsanded Cement Grout: ANSI A118.6, color as indicated.
- F. Polymer-Modified Tile Grout: ANSI A118.7, color as indicated.
  - Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
    - a. Unsanded grout mixture for joints 1/8 inch and narrower.
    - b. Sanded grout mixture for joints 1/8 inch and wider.
- G. Grout for Pregrouted Tile Sheets: Same silicone rubber used in factory to pregrout tile sheets.

## 2.7 ELASTOMERIC SEALANTS

1

- A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 7 Section "Joint Sealants."
  - 1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
  - 1. Available Products:
    - a. Dow Corning Corporation; Dow Corning 786.
    - b. GE Silicones; Sanitary 1700.
    - c. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
    - d. Tremco, Inc.; Tremsil 600 White.
- D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.
  - 1. Available Products:
    - a. Bostik; Chem-Calk 550.
    - b. Mameco International, Inc.; Vulkem 245.
    - c. Pecora Corporation; NR-200 Urexpan.
    - d. Tremco, Inc.; THC-900.

#### 2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, Portland cementbased formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Protection: L-shape, height to match tile and setting-bed thickness, satin anodized aluminum finish. Equal to Schluer Systems 2.12-Indec.

- C. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
  - 1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
  - 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

## 2.9 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

## PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
  - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
  - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Provide concrete substrates for tile floors installed with thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
  - 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
  - 2. Remove protrusions, bumps, and ridges by sanding or grinding.

- C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

## 3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
  - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Refer to TCA's "Handbook for Ceramic Tile Installation" and to ANSI A108 Series of tile installation standards for data on expansion joints. Both require joint locations to be indicated on Drawings. There is no substitute for showing all joints on Drawings.
- H. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
  - 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- I. Grout tile to comply with requirements of the following tile installation standards:
  - 1. For ceramic tile grouts (sand-Portland cement; dry-set, commercial Portland cement; and latex-Portland cement grouts), comply with ANSI A108.10.
- J. At showers, tubs, and where indicated, install cementitious backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

#### 3.4 CRACK-SUPPRESSION MEMBRANE INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
- B. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.
- C. Provide crack isolation sheets over the entire concrete subfloor to receive tile work.
- D. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

#### 3.5 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.
  - 1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
    - a. Tile floors composed of tiles 8 by 8 inches or larger.
    - b. Tile floors composed of rib-backed tiles.
- B. Joint Widths: Install tile on floors with 1/8-inch joint widths.
- C. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.
  - 1. Set thresholds in latex-Portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.
- D. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

#### 3.6 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.
- B. Install metal lath and scratch coat for walls to comply with ANSI A108.1A, Section 4.1.
- C. Joint Widths: Install tile on walls with the following joint widths:
  - 1. Glazed Wall Tile: 1/16 inch.
  - 2. Glass Tile: 1/16 inch.

#### 3.7 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove latex-Portland cement grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

- 3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

## 3.8 FLOOR TILE INSTALLATION SCHEDULE

- A. Tile Installation: Interior floor installation on concrete; thin-set mortar; TCA F113 and ANSI A108.5.
  - 1. Tile Type: Unglazed ceramic mosaic tile.
  - 2. Thin-Set Mortar: Dry-set Portland cement mortar.
  - 3. Grout: Standard sanded cement grout.
- B. Tile Installation: Interior floor installation on crack-suppression membrane over concrete; thin-set mortar; TCA F122 and ANSI A108.5.
  - 1. Tile Type: Unglazed ceramic mosaic tile.
  - 2. Thin-Set Mortar: Latex-Portland cement mortar.
  - 3. Grout: Polymer-modified sanded grout.

## 3.9 WALL TILE INSTALLATION SCHEDULE

- A. Tile Installation: Interior wall installation over sound, dimensionally stable masonry or concrete; thin-set mortar; TCA W202 and ANSI A108.5.
  - 1. Tile Type: Glazed wall tile.
  - 2. Thin-Set Mortar: Dry-set Portland cement mortar.
  - 3. Grout: Standard unsanded cement grout.
- B. Tile Installation: Interior wall installation over gypsum board; thin-set mortar; TCA W243 and ANSI A108.5.
  - 1. Tile Type: Glazed wall tile.
  - 2. Thin-Set Mortar: Dry-set Portland cement mortar.
  - 3. Grout: Standard unsanded cement grout.
- C. Tile Installation: Interior wall installation over cementitious backer units; thin-set mortar; TCA W244 and ANSI A108.5.
  - 1. Tile Type: Glazed wall tile.
  - 2. Thin-Set Mortar: Dry-set Portland cement mortar.
  - 3. Grout: Standard unsanded cement grout.
- D. Tile Installation: Interior wall installation over glass-mat, water-resistant backer board; thin-set mortar; TCA W245 and ANSI A108.5.
  - 1. Tile Type: Glazed wall tile.
  - 2. Thin-Set Mortar: Dry-set Portland cement mortar.
  - 3. Grout: Standard unsanded cement grout.

END OF SECTION

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## SECTION 09 51 23 ACOUSTICAL TILE CEILINGS

## PART 1 GENERAL

## 1.1 SECTION INCLUDES

- A. Suspended metal grid ceiling system and perimeter trim.
- B. Acoustical tile.
- C. Non-fire rated assembly.

#### 1.2 RELATED SECTIONS

- A. Division 22: Sprinkler heads in ceiling system.
- B. Division 23: Air diffusion devices in ceiling system.
- C. Division 26: Light fixtures in ceiling system.
- D. Division 28: Fire alarm components in ceiling system.

#### 1.3 REFERENCES

- A. ASTM C635 Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- B. ASTM C636 Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- C. ASTM C665 Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- D. ASTM E580 Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint.
- E. ASTM E1264 Classification of Acoustical Ceiling Products.
- F. Ceilings and Interior Systems Contractors Association (CISCA) Acoustical Ceilings: Use and Practice.
- G. UL Fire Resistance Directory and Building Material Directory.

#### 1.4 SYSTEM DESCRIPTION

A. Suspension system to rigidly secure acoustical ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

## 1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system.
- C. Product Data: Provide data on metal grid system components, and acoustical units.

## ACOUSTICAL TILE CEILINGS

- D. Samples: Submit two samples 6 x 6 inch in size illustrating material and finish of acoustical units.
- E. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner, and edge trim.
- F. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

#### 1.6 QUALIFICATIONS

- A. Grid Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

#### 1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for combustibility requirements for materials.

## 1.8 ENVIRONMENTAL REQUIREMENTS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

## 1.9 SEQUENCING

- A. Sequence work under the provisions of Section 01 31 00.
- B. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Install acoustical units after interior wet work is dry.

## 1.10 EXTRA MATERIALS

- A. Furnish under provisions of Section 01 73 00.
- B. Provide 5 percent of total acoustical unit area of each type of extra tile to Owner.

#### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS - SUSPENSION SYSTEM

- A. Specified Manufacturer: Armstrong.
- B. Other Acceptable Manufacturers:
  - 1. Chicago.
  - 2. Donn.
- C. Substitutions: Under provisions of Section 01 60 00.

#### 2.2 SUSPENSION SYSTEM MATERIALS

- A. Non-fire Rated Grid: ASTM C635, intermediate duty; exposed T paired access T; components die cut and interlocking.
  - 1. Use Armstrong's Prelude 15/16-inch w/Type 1 and Type 2 ceilings.
  - 2. Use Armstrong's Prelude Plus 15/16-inch w/Type 3 Ceiling.
- B. Grid Materials: Cold rolled steel.
  - 1. Prelude Plus 15/16 inch: Galvanized and coated steel with aluminum cap as required.
- C. Exposed Grid Surface Width: 15/16 inch.
- D. Grid Finish: color as selected.
- E. Accessories: Stabilizer bars clips splices edge moldings and hold down clips required for suspended grid system.
- F. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.

## 2.3 MANUFACTURERS - ACOUSTICAL UNITS

- A. Specified Manufacturer: Armstrong
- B. Other Acceptable Manufacturers
  - 1. USG
  - 2. Celotex.
- C. Substitutions: Under provisions of Section 01 60 00.

## 2.4 ACOUSTICAL UNIT MATERIALS

- A. Acoustical Panels: (C1) Ultima #1941 conforming to the following:
  - 1. Size: 24 x 24 inches
  - 2. Thickness: 7/8 inch
  - 3. Composition: wet form mineral fiber
  - 4. Density: 1.25 lbs./sf
  - 5. Light Reflectance: 0.87
  - 6. NRC Range: 0.80
  - 7. Fire Spread: Class A
  - 8. Edge: Beveled Tegular
  - 9. Surface Color: White
  - 10. Surface Finish: Factory applied latex paint
  - 11. Suspension System: Prelude 15/16"

## B. Acoustical Panels: (C2): Pebble #2988 - conforming to the following:

- 1. Size: 24 x 24 inches
- 2. Thickness: 1 inch
- 3. Composition: fiberglass with vinyl facing
- 4. Density: .31 lbs./sf
- 5. Light Reflectance: 0.89
- 6. NRC Range: 0.80
- 7. Flame Spread: Class A
- 8. Edge: Square Lay-In
- 9. Surface Color: White
- 10. Surface Finish: Scrubbable vinyl film facing
- 11. Suspension System: Prelude 15/16"

- C. Acoustical Panels: (C8): Optima Health Zone #3214PB - conforming to the following:
  - $24 \times 24$  inches 1. Size:
  - 2. Thickness: 1 inch
  - 3. Composition: fiberglass with Durabrite scrim acoustically transparent membrane
  - .45 lbs./sf 4. Density: 0.86
  - 5. Light Reflectance:
  - NRC Range: 0.95 6.
  - 7. Flame Spread: Class A
  - Square Tegular 8. Edge:
  - 9. Surface Color: White
  - 10. Surface Finish: Durabrite factory applied latex paint
  - Prelude Plus 15/16 11. Suspension System:

#### 2.5 ACCESSORIES

Touch-up Paint: Type and color to match acoustical and grid units. Α.

## PART 3 EXECUTION

#### 3.1 **EXAMINATION**

- A. Verify site conditions under provisions of Section 01 31 00.
- Β. Verify that layout of hangers will not interfere with other work.

#### 3.2 **INSTALLATION - LAY-IN GRID SUSPENSION SYSTEM**

- A. Install suspension system in accordance with manufacturer's instructions and as supplemented in this section.
- Β. Install system capable of supporting imposed loads to a deflection of 1/360 maximum.
- C. Locate system on room axis according to reflected plan.
- D. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
- E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- Do not support components on main runners or cross runners if weight causes total dead load to G. exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
- H. Do not eccentrically load system or produce rotation of runners.
- I. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions.
- J. Form expansion joints where required. Form to accommodate plus or minus 1-inch movement. Maintain visual closure.

## 3.3 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units one way with pattern parallel to shortest room axis in basket weave pattern. Fit border trim neatly against abutting surfaces.
- D. Install units after above ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp and dents.
- F. Cut tile to fit irregular grid and perimeter edge trim. Field rabbet tile edge. Double cut and field paint exposed edges of regular units.
- G. Where bullnose concrete block corners round obstructions occur, provide preformed closers to match edge molding.
- H. Install hold-down clips to retain panels tight to grid system.

## 3.4 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

#### 3.5 SCHEDULE

- A. Type C1: General
- B. Type C2: Restroom
- C. Type C8: Cafe

#### END OF SECTION

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#### SECTION 09 65 00

## **RESILIENT FLOORING**

## PART 1 GENERAL

## 1.1 SECTION INCLUDES

- A. Quartz tile.
- B. Vinyl cove base.

#### 1.2 RELATED SECTIONS

B. Section 03 30 00 - Cast-in-Place Concrete: Floor substrate surface.

## 1.3 REFERENCES

- A. ASTM E84 Surface Burning Characteristics of Building Materials.
- B. FS L-F-1641 Floor Covering, Translucent or Transparent Vinyl Surface, with Backing.
- C. FS L-F-475 Floor Covering, Vinyl Surface (Tile and Roll), with Backing.
- D. FS RR-T-650 Treads, Metallic and Non-metallic, Non-skid.
- E. FS SS-T-312 Tile, Floor: Asphalt, Rubber, Vinyl, and Vinyl Composition.
- F. FS SS-W-40 Wall Base: Rubber and Vinyl Plastic.

#### 1.4 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/ fuel/smoke rating requirements of in accordance with ASTM E84.

#### 1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Provide product data on specified products, describing physical and performance characteristics, sizes, patterns and colors available.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit two samples 3 x 3 inches in size, illustrating color and pattern for each floor material specified.
- E. Submit two 3-inch-long samples of base material for each color specified.
- F. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

#### **RESILIENT FLOORING**

#### 1.8 OPERATION AND MAINTENANCE DATA

- A. Submit cleaning and maintenance data under provisions of Section 01 78 20.
- B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

## 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

## 1.10 EXTRA MATERIALS

A. Provide 100 sq. ft of each color of selected flooring and 1 coil of each base color of each material specified under provisions of Section 01 73 00.

## PART 2 PRODUCTS

- 2.1 QUARTZ TILE OFFICE AT TICKET COUNTERS (F4)
  - A. Quartz Tile: Equal to UpoFloor Quartz Mosaic Collection, 24" x 24", 2.0 mm thick, ASTM F 1066. Color selected from manufacturer's full line of samples.

#### 2.2 Rubber BASE

A. Rubber Base: Equal to Johnsonite Rubber Base, 4.25" high, millwork reveal profile. Color to be selected by Architect.

#### 2.3 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Primers and Adhesives: Types recommended by flooring material manufacturer. Adhesive shall be equal to Armstrong S-89 or S-90 Resilient Tile Adhesive.
- C. Edge Strips: Flooring material.
- D. Transition Strips: Types and profiles recommended by flooring manufacturer. Colors as selected by Owner/Architect from manufacturer's full range.

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft and are ready to receive Work.

- B. Verify concrete floors are dry to a maximum moisture content of 7 percent, and exhibit negative alkalinity, carbonization, or dusting.
- C. Beginning of installation means acceptance of substrate and site conditions.

## 3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
- B. Apply, trowel, and float filler to leave a smooth, flat, hard surface.
- C. Prohibit traffic from area until filler is cured.
- D. Vacuum clean substrate.
- E. Apply primer to surfaces.

## 3.3 INSTALLATION - TILE MATERIAL

- A. Install in accordance with manufacturers' instructions.
- B. Mix tile from container to ensure shade variations are consistent.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Set flooring in place; press with heavy roller to attain full adhesion.
- E. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile patterns.
- F. Install tile to square grid pattern with all joints aligned and with pattern grain parallel for all units and parallel to width of room. Allow minimum 1/2 full size tile width at room or area perimeter.
- G. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- H. Install edge strips at unprotected or exposed edges, and where flooring terminates.
- I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- J. Install flooring in pan type floor access covers. Maintain floor pattern.
- K. Install flooring under movable partitions without interrupting floor pattern.
- L. Install feature strips, and floor markings where indicated. Fit joints tightly.
- 3.4 INSTALLATION BASE MATERIAL
  - A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

- B. Miter internal corners. At external corners, use premolded units. At exposed ends use premolded units.
- C. Install base on solid backing. Bond tight to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

## 3.5 **PROTECTION**

A. Prohibit traffic on floor finish for 48 hours after installation.

## 3.6 CLEANING

- A. Refer to Section 01 73 00 Execution.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage to finish.
- C. Recommended cleaning instructions from manufacturer.

## END OF SECTION

#### SECTION 09 68 00 CARPETING

#### PART 1 GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Carpet, carpet tile, and accessories.

#### 1.2 SUBMITTALS

- A. Product Data: For the following, including installation recommendations for each type of substrate:
  - 1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
- B. Shop Drawings: Show the following:
  - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
  - 2. Carpet type, color, and dye lot.
  - 3. Seam locations, types, and methods.
  - 4. Type of subfloor.
  - 5. Type of installation.
  - 6. Pattern type, repeat size, location, direction, and starting point.
  - 7. Pile direction.
  - 8. Type, color, and location of edge, transition, and other accessory strips.
  - 9. Transition details to other flooring materials.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
  - 1. Carpet: 12-inch- square Sample.
  - 2. Exposed Edge, Transition, and other Accessory Stripping: 12-inch-long Samples.
- D. Product Schedule: For carpet, use same designations indicated on Drawings.
- E. Qualification Data: For Installer.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.
- G. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
  - 1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  - 2. Precautions for cleaning materials and methods that could be detrimental to carpet.
- H. Warranties: Special warranties specified in this Section.

#### 1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

#### CARPETING

- B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to carpet installation including, but not limited to, the following:
  - 1. Review delivery, storage, and handling procedures.
  - 2. Review ambient conditions and ventilation procedures.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104, Section 5, "Storage and Handling."

## 1.5 PROJECT CONDITIONS

- A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."
- B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.

#### 1.6 WARRANTY

- A. Special Warranty for Carpet: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.
  - 3. Warranty Period: 10 years from date of Substantial Completion.

## 1.7 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

## PART 2 PRODUCTS

#### 2.1 CARPET TILE

- A. Carpet Tile (F3): J&J Flooring Index Style 7008, conforming to the following:
  - 1. Construction: Patterned loop
  - 2. Fiber Type: Encore BCF nylon w/ColorLoc Plus
  - 3. Dye Method: Solution/yarn dyed
  - 4. Ounce Weight:  $20 \text{ oz/sy} (678 \text{ grams/m}^2)$

- 5. Gauge: 1/10 (3.94 rows/cm)
- 6. Backing: Nexus modular
- 7. Size: 24" x 24" (61 cm x 61 cm)
- 8. Total Thickness: .025 inches (0.64 cm)
- 9. Warranties: Lifetime fiber performance for wear and static; lifetime stain removal; lifetime colorfastness to light and atmospheric contaminants; lifetime for tuft bind strength (edge ravel, yarn pulls, zippering); lifetime against delamination; lifetime dimensional stability
- 10. Installation: 1/4 turn

## B. Carpet Tile (F5): J&J Flooring with a twist 7080, conforming to the following:

- 1. Construction: Textured loop
- 2. Fiber Type: Encore SD Ultima nylon with recycled content
- 3. Dye Method: Solution dyed
- 4. Ounce Weight:  $21.0 \text{ oz/sy} (712 \text{ grams/m}^2)$
- 5. Gauge: 1/10 (3.94 rows/cm)
- 6. Backing: Nexus modular
- 7. Size: 24" x 24" (61 cm x 61 cm)
- 8. Total Thickness: .025 inches (0.64 cm)
- 9. Warranties: Lifetime fiber performance for wear and static; lifetime stain removal; lifetime colorfastness to light and atmospheric contaminants; lifetime for tuft bind strength (edge ravel, yarn pulls, zippering); lifetime against delamination; lifetime dimensional stability
- 10. Installation: Monolithic

C. Carpet Tile (F6): J&J Flooring Catwalk II 7268, conforming to the following:

- 1. Construction: Textured patterned loop
- 2. Fiber Type: 100% Encore SD Nylon with recycled content
- 3. Dye Method: Solution dyed
- 4. Ounce Weight:  $34.0 \text{ oz/sy} (1153 \text{ grams/m}^2)$
- 5. Gauge: 1/10 (3.94 rows/cm)
- 6. Backing: Nexus modular
- 7. Size: 24" x 24" (61 cm x 61 cm)
- 8. Total Thickness: .0375 inches (0.95 cm)
- 9. Warranties: Lifetime fiber performance for wear and static; lifetime stain removal; lifetime colorfastness to light and atmospheric contaminants; lifetime for tuft bind strength (edge ravel, yarn pulls, zippering); lifetime against delamination; lifetime dimensional stability
- 10. Installation: 1/4 turn
- D. Carpet Tile (M8 Temporary Phasing Carpet): J&J Flooring Passages 3036, conforming to the following:
  - 1. Construction: Level loop
  - 2. Nylon Fiber Type: Encore SD Ultima (with recycled content)
  - 3. Dye Method: Solution dyed
  - 4. Face Weight: 20 oz/sy (678 grams/m<sup>2</sup>)
  - 5. Gauge: 1/10 (3.94 rows/cm)
  - 6. Backing: Premier Bac Plus (standard backing)
  - 7. Standard Width: 12'

8. Standard Warranties: Encore SD Ultima Fiber, PremierBac Plus, Commercialon Premium Broadloom Adhesive.

#### 2.2 INSTALLATION ACCESSORIES

1.

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
  - VOC Limits: Provide adhesives that comply with the following limits for VOC content when tested according to ASTM D 5116:
    - a. Total VOCs: 10.00 mg/sq. m x h.
    - b. Formaldehyde: 0.05 mg/sq. m x h.
    - c. 2-Ethyl-1-Hexanol: 3.00 mg/sq. m x h.
- C. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
  - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet manufacturer.
  - 2. Subfloor finishes comply with requirements specified in Division 3 Section "Castin-Place Concrete" for slabs receiving carpet.
  - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8-inch-wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.

- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

## 3.3 INSTALLATION

- A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
  - 1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."
- B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- C. Do not bridge building expansion joints with carpet.
- D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.
- H. Comply with carpet cushion manufacturer's written recommendations.
- I. The manufacturer's representative shall be present upon start of carpet installation to insure proper installation methods.

#### 3.4 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet surface.
  - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, "Protection of Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

#### END OF SECTION

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## SECTION 09 90 00 PAINTING

## PART 1 GENERAL

## 1.1 SECTION INCLUDES

A. Surface preparation and field application of paints and coatings.

## 1.2 RELATED SECTIONS

- A. Section 05 12 00 Structural Steel Field finish.
- B. Section 05 30 00 ER6.5 Steel Deck
- C. Section 05 31 00 Steel Decking: Field finish of exposed deck.
- D. Section 05 50 00 Metal Fabrications: Shop primed items.
- E. Section 06 20 00 Finish Carpentry Field Finish.
- F. Section 08 11 00 Steel Doors and Frames Field Finish.
- G. Section 08 21 00 Flush Wood Doors
- H. Section 09 26 00 Gypsum Board Systems.
- I. Division 23 Mechanical Identification and Painting of Exposed Ductwork
- J. Division 26 Electrical: Electrical Identification.

#### 1.3 REFERENCES

- A. ASTM D16 Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
- B. ASTM D2016 Test Method for Moisture Content of Wood.
- C. AWWA (American Water Works Association) C204 Chlorinated Rubber-Alkyd Paint Systems for the Exterior of Above Ground Steel Water Piping.
- D. AWWA (American Water Works Association) D102 Painting Steel Water Storage Tanks.
- E. NACE (National Association of Corrosion Engineers) Industrial Maintenance Painting.
- F. NPCA (National Paint and Coatings Association) Guide to U.S. Government Paint Specifications.
- G. PDCA (Painting and Decorating Contractors of America) Painting Architectural Specifications Manual.
- H. SSPC (Steel Structures Painting Council) Steel Structures Painting Manual.

#### 1.4 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this Section.

#### PAINTING

#### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Provide data on all finishing products.
- C. Samples: Submit two color chip selection catalogs illustrating range of colors available for each surface finishing product scheduled.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention.
- E. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years documented experience.
- B. Applicator: Company specializing in performing the work of this section with minimum five (5) years documented experience and approved by manufacturer.

## 1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for finishes.

#### 1.8 FIELD SAMPLES

- A. Provide field sample of paint under provisions of Section 01 40 00.
- B. Provide field sample classroom, illustrating special coating color, texture, and finish.
- C. Locate where directed.
- D. Accepted sample may remain as part of the Work.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container label to 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.
- D. Store paint materials 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.

## 1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish and Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

## 1.12 EXTRA MATERIALS

- A. Furnish under provisions of Section 01 73 00.
- B. Provide 1 gallon of each color, and type to Owner.
- C. Label each container with color, type, texture, room locations, and in addition to the manufacturer's label.

#### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers Paint
  - 1. PPG.
  - 2. Sherwin-Williams.
  - 3. Benjamin Moore.
- B. Manufacturers Transparent Finishes
  - 1. Min-Wax.
  - 2. PPG Model REZ.
  - 3. Valspar
- C. Manufacturers Stain
  - 1. Min-Wax.
  - 2. PPG Model REZ.
  - 3. Valspar.
- D. Manufacturers Primer Sealers
  - 1. PPG 6 Line.
  - 2. Benjamin Moore.
  - 3. Sherwin-Williams.
  - 4. Duron
- E. Substitutions: Under provisions of Section 01 60 00.

## 2.2 MATERIALS

- A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
- C. Patching Materials: Latex filler.

D. Fastener Head Cover Materials: Latex filler.

## 2.3 FINISHES

A. Refer to schedule at end of section for surface finish schedule. Colors will be selected during construction.

## PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01 31 00.
- B. Verify that surfaces and substrate conditions 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 is below the following maximums:
  - 1. Plaster and Gypsum Wallboard: 12 percent.
  - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
  - 3. Interior Wood: 15 percent, measured in accordance with ASTM D2016.

## 3.2 PREPARATION

- A. Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Correct defects and clean surfaces which affect work of this section. Remove existing coatings that exhibit loose surface defects.
- C. Seal with shellac and seal marks which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- F. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- H. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: 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.
- I. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

- J. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by 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. Spot prime paint after repairs.
- K. Shop Primed Steel Surfaces: 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.
- L. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- M. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.
- N. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

## 3.3 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry.
- C. Apply each coat to uniform finish.
- D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- E. Sand wood and metal lightly between coats to achieve required finish.
- F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
- G. Allow applied coat to dry before next coat is applied.
- H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Prime concealed surfaces of interior woodwork with primer paint.
- J. Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

## 3.4 CLEANING

- A. Clean work under provisions of 01 73 00.
- B. Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

## 3.5 INTERIOR PAINT SYSTEMS

- A. NEW MASONRY:
  - 1. Acrylic Latex System (Dry Areas)
    - a. 1st Coat: S-W PrepRite® Block Filler, B25W25 (75-125 sq. ft/gal)
    - b. 2nd & 3rd Coats: Semi-gloss S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600.
  - 2. High Performance Catalyzed Epoxy System (High Moisture Areas)
    - a. 1st Coat: S-W KEM CATI-COAT HS Epoxy Filler/Sealer B42W400 Series.

- b. 2nd & 3rd Coats: Gloss: S-W Pro Industrial HP Epoxy, B67-200 Series.
- B. GYPSUM BOARD & PLASTER:
  - 1. 1<sup>st</sup> Coat: Latex Primer: S-W ProMar 200 Zero VOC Latex Primer, B28W2600.
  - 2. 2<sup>nd</sup> & 3<sup>rd</sup> Coats: Eggshell Latex: S-W ProMar 200 Zero VOC Latex Egg-Shell, B20-2600. Apply 1<sup>st</sup> coat only on walls receiving vinyl wall covering.
- C. FERROUS METALS:
  - 1. 1st Coat: Primer S-W Pro Industrial Pro-Cryl Primer, B66-310 Series.
  - 2. 2nd & 3rd Coat: Semi-Gloss: S-W Pro Industrial Pre-Catalyzed Watrerbased Epoxy, K45 Series.
- D. WOOD DOORS AND TRIM (New)
  - 1. 1st Coat: Oil/Wiping Stain: Match existing wood with clear wood sealer.

2. 2nd and 3rd Coats: Polyurethane Satin: S-W Wood Classics® Watreborne Polyurethane Varnish, Satin.

- E. WOOD PAINTED
  - 1. lst Coat (Primer): S-W Premium Wall & Wood Primer, B28W8111.
  - 2. 2nd & 3rd Coats: Semi-Gloss: S-W ProMar 200 Water based Acrylic/.Alkyd Semi-Gloss, B34-8200.
- F. METAL DOORS, TRIM & EXPOSED STRUCTURAL STEEL
  - 1. Touch-up existing primer. S-W Pro Industrial Pro-Cryl Primer, B66-310 Series.
  - 2. 2nd & 3rd Coats: Semi-Gloss: S-W Pro Industrial Pre-Catalyzed Water based Epoxy, K45.

## 3.6 EXTERIOR PAINT SYSTEMS

- A. Ferrous metals (normal use and atmosphere).
  - 1. Location: All structural and miscellaneous steel, hollow metal doors and frames and fire hydrants.
  - 2. System: Oil Alkyd (gloss).
    - a. First Coat: Touch-up Primer: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series.
    - b. Second and Third Coat: S-W Pro Industrial Urethane Alkyd Enamel, B54-100 Series.
- B. Fiber Cement Siding & Trim (Acrylic Latex System)
  - 1. 1<sup>st</sup> Coat (primer): S-W Loxon Concrete Masonry Primer Sealer, A24W8300.
  - 2. 2<sup>nd</sup> Coat: Exterior Flat: S-W A-100 Exterior Latex Flat, A6 Series.

#### 3.7 SCHEDULE

- A. Existing steel tube trusses and purlins
  - 1. Touch up exposed areas damaged during construction.
- B. New steel tubes trusses and purlins
  - 1. Shop primed, and field painted per Article 3.5. Color to match existing Blue.

## END OF SECTION
## SECTION 09 96 60 CLEAR, WRITE-AND-ERASE FINISH

## PART 1 GENERAL

## 1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General Conditions, Division 1, and other applicable specification sections in the Project Manual apply to the work specified in this Section.

## 1.2 SUMMARY

- A. Scope: Provide labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing and application for clear, write-and-erase finishes as required for the complete performance of the work, and as shown on the Drawings and as herein specified.
- B. Section Includes: The work specified in this Section includes, but shall not be limited to, a water-based finish for interior walls that is specially formulated to work as a write-and-erase surface.

## 1.3 REFERENCES

- A. General: The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest date as of the date of the Contract Documents, unless otherwise specified.
  - 1. *Gypsum Association (GA):* GA 214, "Recommended Specification: Levels of Gypsum Board Finish."
  - 2. American Society for Testing and Materials (ASTM): ASTM D 2486, "Standard Test Method for Scrub Resistance of Interior Latex Flat Wall Paints." ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials."
  - 3. *South Coast Air Quality Management District (SCAQMD):* SCAQMD Rule #1168, "Adhesive and Sealant Applications," including most recent amendments.

## 1.4 SUBMITTALS

- A. General: See Section 01 33 00 Submittal Procedures
  - 1. Maintenance Data: Submit maintenance data for clear, dry erase finishes to include in operation and maintenance manuals specified in Division 1.
- B. Product Data: Submit product data showing material proposed. Submit sufficient information to determine compliance with the Drawings and Specifications.
- C. Quality Control Submittals
  - 1. Qualification Data: Submit qualification data for firms and persons specified in Quality Assurance Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names of architects and owners, and other information specified.
  - 2. Test Reports: Submit product test reports from a qualified independent inspecting and testing agency showing compliance of clear write/erase finishes with requirements, based on comprehensive testing of current product formulations within the last two years.

## 1.5 QUALITY ASSURANCE

## A. Qualifications

- 1. Manufacturer Qualifications: Manufacturer shall be a firm engaged in the manufacture of clear finishes of type required, and whose products have been in satisfactory use in similar service for a minimum of five years.
- 2. Applicator Qualifications: Applicator shall be a firm that shall have a minimum of five years of successful application experience with projects utilizing clear finishes similar in type and scope to that required for this Project.
- 3. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.
- 4. Mock Ups: Prior to application of the work, fabricate and erect mock ups foreach type of finish and application required to demonstrate aesthetic effects as well as qualities of materials and execution. Build mock ups to comply with the following requirements, using materials indicated for final unit of work. Locate mock ups on site in location and of size indicated or, if not indicated, as directed by the Architect. Demonstrate the proposed range of aesthetic effects and workmanship to be expected in the completed work. Obtain the Architect's acceptance of mock ups before start of final unit of work. Retain and maintain mock ups during construction in undisturbed condition as a standard for judging completed unit of work.
  - a. Accepted mock ups in undisturbed condition at time of Substantial Completion may become part of completed unit of work.
- 5. Pre-Application Conference: Conduct pre-application conference in accordance with Section 01039. Prior to commencing the application, meet at the Project site to review the material selections, application procedures, and coordination with other trades. Mock ups shall be reviewed during the pre-application conference. Pre-application conference shall include, but shall not be limited to, the Contractor, the Applicator, manufacturer's representatives, and any trade that requires coordination with the work. Date and time of the pre-application conference shall be acceptable to the Owner and the Architect.

# 1.6 DELIVERY AND STORAGE

- A. Delivery: Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.
- B. Storage: Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

# 1.7 PROJECT CONDITIONS

A. Environmental Requirements: Do not apply Wink finish until space is enclosed and weatherproof, wet work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

## PART 2 PRODUCTS

## 2.1 MATERIALS

- A. Technical Information and Test Results
  - 1. Suitable Substrates: Gypsum board, smooth sealed wood, previously painted surfaces, and others in accordance with the manufacturer's recommendations

- 2. Colors Available: Finish is clear
- 3. Coverage Rate: Kits will provide coverage of approximately 50, 100, or 200 square feet of surface area
- 4. Finish: Gloss 92 at a 60 degree
- 5. Maximum VOC: Less than 50 grams per liter, EPA Test Method 27
- 6. Fire Rating: Class A or Class I, ASTM E 84
- 7. Scrub Resistance: 10,000+ scrub cycles, ASTM D 2486
- 8. Stain Removal: Excellent rating.
- 9. Basis of Design: Product specified is "Wink" as manufactured by Master Coating Technologies. Items specified are to establish a standard of quality for design, function, materials, and appearance. Equivalent products by other manufacturers are acceptable. The Architect will be the sole judge of the basis of what is equivalent.
- 10. Accessories: Provide accessories as recommended by the manufacturer, including, but not limited to, the following:
  - a. Markers: Expo Low Odor or Bold Dry Erase Markers.
  - b. Cleaner/Wipes: Expo Dry Erase Board Cleaner and/or Cleaning Wipes.

# PART 3 EXECUTION

# 3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which the work is to be applied, and notify the Contractor in writing, with a copy to the Owner and the Architect, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Applicator.

## 3.2 PREPARATION

- A. Product Preparation: Gloves, goggles, and a respirator shall be worn when pouring and mixing. Thinning is not required for brush or roller application.
- B. Surface Preparation: Prepare surfaces to Level 5 smoothness in accordance with GA 214. Primer/sealers and base coats may be brushed, rolled, or sprayed. Sprayed application is preferred in order to provide the smoothest surface for the application of the Wink write-and-erase finish.
- C. Gypsum Board: Prepare to Level 5 finish for best results. Provide two base coats of manufacturer's recommended product. Ensure uniform color across surface.
- D. Primed Metal: Provide two base coats of manufacturer's recommended product.
- E. Unprimed Metal: Provide manufacturer's recommended primer and two base coats of product.
- F. Previously Painted Surfaces: Provide two base coats of manufacturer's recommended product.

# 3.3 APPLICATION

A. Required Materials: Nine-inch, lint-free 1/4" nap roller cover; paint roller; metal painter's tray; low-tack painter's tape; Wink Part A, Part B, and a stir stick.

- B. Preparation
  - 1. Over Existing Painted Surfaces: The surface should be clean, dry, and free of grease and mildew. Since Wink is a high-gloss, clear coating, it will highlight any imperfections, so take the necessary steps to ensure a smooth surface prior to application.
  - 2. If Repainting Before Applying Wink: Sand the existing wall to remove any high points or imperfections and fill any holes or scratches. Apply primer and paint so the wall is as smooth as possible with very little stipple and no lap marks or roller lines. Allow to fully dry (4+ hours depending on conditions) before applying Wink.

*IMPORTANT: Mask surrounding areas with low-tack painter's tape. Wink dries quickly, so remove tape while finish is still wet. Any material found under the painter's tape can be removed with a damp rag.* 

C. Mixing: Stir mixture while pouring Part B into Part A. Mix thoroughly for 3 to 3-1/2 minutes. As Parts A and B are incorporated, Wink will begin to thicken slightly. Be sure to incorporate any unmixed paint on the inner sides of the can into the middle. Allow mixed Wink to "sweat-in" for 5 minutes.

*IMPORTANT:* Once Parts A and B are mixed, Wink must be used within 1 hour. Do not combine multiple kits. Do not reseal cans once opened; contents will expand.

- D. Application: Pour Wink into a clean metal tray and apply with a lint-free 1/4" nap roller. Cut in only as far as you are able to paint before the mixture begins to dry. Roll vertically, maintaining a wet edge. Lay off in one direction, from top to bottom. Work in manageable 3–4 ft. sections. Inspect the application from multiple angles to ensure uniform coverage and no pinholes.
- E. Curing: Surface will be writable in 4 days.

## 3.4 CLEANING AND MAINTENANCE

- A. Clean Up: Dispose of roller. Clean equipment immediately after application with warm soapy water and disposable rag. Do not flush waste material into any drain.
- B. Disposal: Product contains no chromium, lead, or mercury. Disposal of containers shall be in accordance with applicable federal, state and local laws and regulations. Comply with requirements of authorities having jurisdiction concerning reuse, recycling, or disposal or unused product.
- C. Maintenance: For daily erasing and cleaning, we recommend using a microfiber cloth. A dry-erase cotton cloth can also be used; however, we do not recommend Expo<sup>®</sup> or other brand felt erasers. Periodically use a clean, damp cloth with mild soap or just water—or disposable wipes—to maintain the surface. Expo *Dry Erase Board Surface Cleaner* or *Cleaning Wipes* also work well. After using a cleaner, it's best to wipe the surface with clean water to remove any residue. Regular household cleaners (such as Win- dex<sup>®</sup> or Formula 409<sup>®</sup>) should not be used, as they can damage the Wink surface.

# 3.5 PROTECTION

A. General: Protect and maintain conditions in a manner acceptable to the Applicator, ensuring that the write-and-erase surface is without damage at time of Substantial Completion.

## SECTION 10 12 00 INFORMATION DISPLAY SYSTEM

## PART 1 GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 specification sections apply to this section.

## 1.02 SUMMARY

- A. This section includes the following component type information display systems:
  - 1. Freestanding Information Display System.
  - 2. Suspended Information Display System.

# 1.03 PERFORMANCE REQUIREMENTS

- A. Structural performance: Design, engineer, and fabricate display systems so that when installed, they are capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials, including anchors and connections and without exhibiting permanent deformation in any of the components making up enclosures:
  - 1. 200 lb. concentrated load at centerline of monitor or sign cabinet.
- B. Corrosion control: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

## 1.04 SUBMITTALS

- A. Product Data:
  - 1. Shop drawing showing fabrication and installation of Information Display Systems, including plans, elevations, sections, details of components, and attachments to other units of work.
  - 2. Manufacturer's recommended maintenance instructions.
  - 3. For illuminated display units, include wiring diagrams and rough-in details.
- B. Manufacturer Information:
  - 1. Provide overview of literature describing manufacturer's overall scope of products and manufacturing capabilities.
  - 2. Provide URL for manufacturer's website; website must provide access to technical data, images and general product information.
- C. Samples for verification of each type of exposed finish required, prepared on components indicated below of same thickness and metal indicated for final unit of work. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected:
  - 1. 6-inch long sections of extruded aluminum mast.
  - 2. Cast stainless steel support arm.
  - 3. 2-foot long section of support beam assembly.

# 1.05 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain display systems of each type and material from a single manufacturer.

- B. Fabricator Qualifications:
  - 1. Fabricator shall have minimum of ten years successful in fabrication of work of this section, similar to items required for this project, shall be approved by the architect prior to the start of production.
  - 2. Fabricator must have sufficient production capacity to produce, transport and deliver required units without causing delay in the work.
  - 3. Fabricator shall have experience of at least five previous successfully completed projects of equal or greater complexity as this project and shall submit photographs for review and acceptances.
- C. Welding Standards:
  - 1. Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel" and AWS D1.3 "Structural Welding Code-Sheet Steel."
  - 2. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

## 1.06 DELIVERY, STORAGE AND HANDLING

- A. Handle products in accordance with manufacturer's instructions.
- B. Store products in manufacturer's original packaging until ready for installation.
- C. Protect products from impacts and abrasion during storage.

## PART 2 PRODUCTS

## 2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, include but are not limited to the following:

Forms+Surfaces 30 Pine Street Pittsburgh, PA 15223 phone: 800-451-0410

fax: 412-781-7840

email: <a href="mailto:sales@forms-surfaces.com">sales@forms-surfaces.com</a>

website: www.forms-surfaces.com

B. Design of Information Display System units is based on the "InForm Flight Information Displays" by Forms+Surfaces. Other manufacturers offering products of similar configuration, quality and performance shall be pre-approved by the architect.

## 2.02 METALS

- A. General: Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.
- B. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of alloy and temper designated below for each aluminum form required:
  - 1. Extruded Bar and Tube: ASTM B 221, alloy 6063-T5/T52.
  - 2. Drawn Seamless Tube: ASTM B 210, alloy 6063-T832.
  - 3. Plate and Sheet: ASTM B 209, alloy 6061-T6.
  - 4. Die and Hand Forgings: ASTM B 247, ally 6061-T6.

- 5. Castings: ASTM B 26, alloy A356-T6.
- 6. Refer to Drawings for aluminum shapes, types and finish designations.
- C. Stainless Steel: Grade or type designated below for each form required:
  - 1. Tubing: ASTM A 554, Grade MT 304
  - 2. Pipe: ASTM A 312, Grade TP 304
  - 3. Castings: ASTM A 743, Grade CF 8 of CF 20
  - 4. Plate: ASTM A 666, Type 304
  - 5. Refer to Drawings for stainless steel shapes, types and finish designations

# 2.03 MISCELLANEOUS MATERIALS

- A. Filler metal and electrodes: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded or brazed and as required for color match, strength, corrosion resistance, and compatibility in fabricated items.
- B. Bituminous paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

## 2.04 FASTENERS

- A. Fasteners for anchoring Information Display System to other construction: Select fasteners of the type, grade and class required to produce connections that are suitable for anchoring display system to other types of construction indicated and capable of withstanding design loadings.
  - 1. Provide fasteners fabricated from alloy type 304 for interior and type 316 stainless steel at exterior. Provide #7 polished finish.
- B. Fasteners for Information Display System: Use fasteners of same basic metal as the fastened metal, unless indicated. Do not use metals that are corrosive or incompatible with materials joined.
  - 1. Provide concealed fasteners for interconnecting display cabinets and for attaching them to other work, except where otherwise indicated.
  - 2. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.

## 2.05 FABRICATION

- A. General: Fabricate information displays to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of hollow members, post spacings, and anchorage, but not less than that required to support structural loads.
- B. Assemble information displays in shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Stainless steel/aluminum Information Display Systems using the following parts and components:
  - 1. Freestanding or suspended units.
  - 2. InForm cast stainless foot assembly Part No. P1.B002.
  - 3. InForm cast stainless 125mm support arm Part No. P1.W009.
  - 4. InForm cast stainless mast end cap Part No. P1.W007.
  - 5. InForm extruded aluminum mast profile Part No. P1.E015.
  - 6. InForm extruded aluminum Conceal extrusion Part No. P1.FS002 (or) extruded aluminum Arc extrusion Part No. P1.FS001.
  - 7. Adjustable brackets for monitor support.
  - 8. Miscellaneous components necessary for a complete installation.

- D. Form simple and compound curves by bending members in fixtures to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of finished material.
- E. Welded connections: Fabricate stainless bumper rails by welding. For connections made during fabrication, weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortions and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- F. Nonwelded connections: Fabricate Information Display System by connecting members with manufacturer's standard concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- G. Brackets, flanges fittings, and anchors: Provide manufacturer's standard brackets, flanges, miscellaneous fittings, and anchors to connect mast profiles to support beam and foot connections.
- H. Provide inserts and other anchorage devices to connect Information Display System to concrete or masonry work. Coordinate anchorage devices with supporting structure on site.
- I. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.
- J. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing work.
- K. Cut, reinforce, drill and tap components, as indicated, to receive finish hardware, screws, and similar items.
- L. Provide power and data management system through mast grommets and components from floor supply points to each electronic component or assembly. Include flexible black rubber connectors as required to conceal all wiring.

## 2.06 FINISHES, GENERAL

- A. Comply with NAAMM "Metal Finishes Manual" recommendations relative to applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering prior to shipment.
- C. Appearance of finished work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within the range of approved samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and they are assembled or installed to minimize contrast.
- D. Stainless steel finishes:
  - 1. Remove or blend tool and die marks and stretch lines into finish.
  - 2. Grind and polish surfaces to produce uniform directional, textured or polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

- 3. Brushed, directional polish: as specified herein above.
- 4. Seastone stainless steel finish as supplied by Forms+Surfaces.

## E. Aluminum finishes:

- 1. Remove or blend tool and die marks into finish.
- 2. Grind and polish surfaces to produce uniform directional, textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- 3. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish; non-specular as fabricated; chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.7 mil (0.018 mm) or thicker) complying with AAMA 607.1.

## PART 3 EXECUTION

## 3.01 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installing anchorages, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete as masonry construction. Coordinate delivery of such items to project site.

## 3.02 INSTALLATION, GENERAL

- A. Fit exposed connections accurately together to form tight, hairline joints.
- B. Cutting, Fitting and Placement: Perform cutting, drilling, and fitting required for installing Information Display units. Set assemblies accurately in location, alignment, and elevation measured from established lines and levels and free from rack:
  - 1. Do not weld, cut, or abrade surfaces of Information Display System components that have been coated or finished after fabrication and are intended for field connection by mechanical or other means without further cutting or fitting.
  - 2. Set posts plumb within a tolerance of <sup>1</sup>/<sub>4</sub>-inch in 12 feet; 1/8-inch in 6 feet.

## 3.03 ANCHORING POSTS

A. Anchor Information Display Systems in concrete with bolts anchored into concrete. Select type of fastener that provides the required performance.

# 3.04 ADJUSTING AND CLEANING

A. Clean stainless steel, glass aluminum in accordance with manufacturers written Instructions.

## 3.05 **PROTECTION**

- A. Protect finishes of displays from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at the time of substantial completion.
- B. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

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# SECTION 10 21 15

# SOLID COLOR REINFORCED COMPOSITE TOILET PARTITIONS

## PART 1 GENERAL

## 1.1 SECTION INCLUDES

A. Solid Color Reinforced Composite Toilet Compartments, ceiling hung.

## 1.2 RELATED SECTIONS

- A. Section 05 50 00 Metal Fabrications: Above ceiling structural support.
- B. Section 09 11 10 Metal Stud Framing System: In wall framing and plates for partition panel support.
- C. Section 10 80 00 Toilet and Bath Accessories.

# 1.3 REFERENCES

- A. ANSI A117.1 Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- B. ANSI/ASTM A424 Steel Sheets for Porcelain Enameling.
- C. ANSI/ASTM A526 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
- D. ASTM A167 Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- E. FS RR-P-1352 Partitions, Toilet, Complete.

## 1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Indicate on shop drawings, partition plan and elevation views, dimensions, details of wall, floor supports, and door swings.
- C. Provide product data on panel construction, hardware, and accessories.
- D. Submit samples under provisions of Section 01 33 00.
- E. Submit two samples 6 x 6 inches in size illustrating panel finish, color, and sheen.
- F. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

## 1.6 WARRANTY

- A. In accordance with Section 01 77 00, submit a manufacturer's 10-year warranty for all products against breakage, corrosion, delamination and defects.
- B. Furnish 1-year warranty against defects in material & workmanship for stainless steel hardware & brackets.

# PART 2 PRODUCTS

# 2.1 MANUFACTURERS

- A. Toilet Partitions: Bobrick Sierra Series (1098) ceiling hung.
- B. Substitutions: Under provisions of the General Conditions to the Construction Contract.

# 2.2 COMPONENTS

A. Toilet Compartments: Solid Color Reinforced Composite panels, doors, and pilasters, ceiling hung.
 1. Color: Single color as selected by architect.

B. Toilet Partition Materials

- 1. Toilet partitions shall be constructed of Solid Color Reinforced Composite material, which is composed of dyes, organic fibrous material, and polycarbonate/phenolic resins. Material shall have a non-ghosting, graffiti-resistant surface integrally bonded to core through a series of manufacturing steps requiring thermal and mechanical pressure. Edges of material shall be the same color as the surface.
- C. Stiles, Panels, Doors, and Screens shall be all manufactured from Solid Color Reinforced Composite material.
- D. Door and Panel Dimensions:
  - 1. Door Thickness: 3/4-inch Panel. Panel thickness 1/2 inch
  - 2. Door Width: 24 inches.
  - 3. Accessible Door Width: 36 inches, out-swinging.
  - 4. Height: 58 inches.
  - 5. Thickness of Pilasters: 3/4 inch.

## 2.3 ACCESSORIES

- A. Head Rails: Extended extruded anodized aluminum satin finish.
- B Brackets: Satin anodized aluminum, to clear color.
- C. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
  - 1. Used for attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
- D. Hardware: 1098G.67 Full Height Gap Free Institutional
  - 1. Heavy-gauge, type 304 satin finished stainless steel.
  - 2. Hinge adjusts for partial opening or self-closing door.
  - 3. Through-bolted panel-to-stile brackets.
  - 4. Reinforced latch with through-bolted keeper.
  - 5. Vandal-resistant door stops.
  - 6. Through-bolted robe hook, one per compartment, mounted on door.

# 2.4 PERFORMANCE REQUIREMENTS

- A. Graffiti Resistance: Partition material shall have the following graffiti removal characteristics when tested in accordance with ASTM D6578-00 Standard Practice for Determination of Graffiti Resistance in accordance with Section 9, "Graffiti Removal Procedure Using Manual Solvent Rubs":
  - 1. Cleanability: Five (5) required staining agents shall be cleaned off material.

- B. Scratch Resistance: Partition material shall have the following characteristics when tested in accordance with ASTM D 2197-98 (2002) Standard Test Method for Adhesion of Organic Coating by Scrape Adhesion, using Gardner Stock # PA-2197/ST pointed stylus attachment on scrape tester:
  - 1. Scratch Resistance: Maximum Load Value shall exceed 10 kilograms.
- C. Impact Resistance: Partition material shall have the following characteristics when tested in accordance with ASTM d2794-93 (1999) el Standard Test Method for Resistance of Organic Coating to the Effects of Rapid Deformation (Impact), using .625" hemispherical indenter with 2-lb. impact weight:
  - 1. Impact Resistance: Maximum Impact Force value shall exceed 30 inch-lbs.
- D. Fire Resistance: Partition material shall comply with the following requirements, when tested in accordance with ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials:
  - 1. Smoke Developed Index: Not to exceed 450.
  - 2. Flame Spread Index: Not to exceed 75.
  - 3. Material Fire Ratings:
    - a. National Fire Protection Association (NFPA): Class B.
    - b. International Code Council (ICC): Class B.

# PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.
- B. Verify correct spacing of plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing, where required.
- D. Beginning of installation means acceptance of substrate.

## 3.2 INSTALLATION

- A. Install partitions secure, plumb, and level and in accordance with manufacturers'instructions.
- B. Maintain 3/8 to 1/2-inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to bracket with through sleeve tamperproof bolts and nuts. Locate head rail joints at pilaster center lines.
- E. Equip each door with continuous hinges, one door latch, and one coat hook and bumper.
- F. Install door strike and keeper with door bumper on each pilaster in alignment with door latch.
- G. Adjust hinges to locate doors in partial open position when unlatched. Return outswing doors to close position.

## 3.3 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

# SOLID COLOR REINFORCED COMPOSITE TOILET PARTITIONS

# 3.4 CLEANING

- A. Remove protective masking. Clean surfaces.
- B. Field touch-up of scratches or damaged finish will not be permitted.
- C. Replace damaged or scratched materials and with new materials.

# SECTION 10 26 00 WALL PROTECTION

# PART 1 GENERAL

# 1.1 SECTION INCLUDES

- A. Flexible wall protection.
- B. Rigid sheet vinyl.
- C. Corner guards.

## 1.2 RELATED SECTIONS

- A. Section 06 11 40 Wood Blocking and Curbing: Support blocking for wall and corner guard anchors.
- B. Section 09 26 00 Gypsum Board System: Wall construction.

# 1.3 REFERENCES

- A. Section 01 40 00 Quality Requirements: Requirements for references and standards.
- B. Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.
- C. ANSI A117.1 Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

# 1.4 PERFORMANCE REQUIREMENTS

- A. Installed Wall Rail Component Assembly:
  - 1. Support vertical live load of 100 lb./lineal ft. with deflection not to exceed 1/50 of span between supports.
  - 2. Resist lateral impact force of 75 lbs. at any point without damage or permanent set.
- B. Corner Guards: Resist lateral impact force of 100 lbs. at any point without damage or permanent set.

# 1.5 SUBMITTALS FOR REVIEW

- A. Section 01 33 00 Submittal Procedures: Procedures for submittals.
- B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, rough-in measurements, and end details.
- C. Samples: Submit two (2) sections of rub rail and corner guard, 24-inch-long, illustrating component design, configuration, color and finish.

# 1.6 SUBMITTALS FOR INFORMATION

- A. Section 01 33 00 Submittal Procedures: Procedures for submittals.
- B. Manufacturer's Instructions: Printed installation instructions for specified products; indicate special procedures, and perimeter conditions requiring special attention.

A. Conform to ADA and ANSI A117.1 requirements for the physically handicapped.

#### 1.8 **PROJECT CONDITIONS**

Α. Coordinate the work with wall or partition sections for installation of concealed blocking or anchor devices.

#### 1.9 WARRANTY

Provide manufacturer's standard five (5) year warranty against defects. A.

# PART 2 PRODUCTS

- MANUFACTURERS 2.1
  - A. In Pro Corp. (IPC): Institutional Products Corp. of Muskego, Wisconsin
  - B. Substitutions: In accordance with Section 01 60 00 – Product Requirements.

#### 2.2 **COMPONENTS**

- Flexible Wall Protection (W4, W5): Equal to Inpro Corp. Ricochet Flexible Wall Protection, A. conforming with the following: 1.
  - Wall coverings: Ricochet<sup>™</sup> Flexible Wall Protection
    - Finished width: 48 inches. a.
    - Inks: HAPS free, Ethyl Acetate. b.
    - Low VOC emitting: с.
      - Meets California 01350 Specification for low VOC emissions. 1)
    - Packaging 15-yard rolls d.
  - **Physical Properties:** 2.
    - Finished total weight: Fed. Spec. CCC-T-191b 5041. a.
      - Thickness: .032" .040" (varies by emboss and finish) 1)
      - 2) 34 to 38 oz. per linear yard (555g to 620 g/linear m). [varies by emboss and finishl
    - b. PVF protective cap film.
      - c. Backing Type: Poly/Cotton knit. (77%/23%)
  - 3. Surface Properties
    - Impact Resistance ASTM D-5420 Gardener Drop Dart 44 to 112+ inch-lbs. a.
    - b. Abrasion Resistance ASTM D-4060 Taber CS-10f wheel 500-gram load – 200 cycles, 0.02% weight loss.
    - Chemical Resistance ASTM D-1308 10 cleaning agents, 10 staining agents, с. after 7 days, no change
    - d. Stain Resistance - ASTM D-1308 - 10 cleaning agents, 10 staining agents, after 7 days, no change
  - 4. **Fire Ratings** 
    - Surface burning characteristics, ASTM E 84: Class A. a.
      - Flame Spread Index: 10 1)
      - 2) Smoke Developed Index: 120.
  - 5. **Environment and Health** 
    - CAL 01350 Certified a.
    - Fungal Resistance ASTM G-21 No growth b.
    - Bacterial Resistance ASTM G-22 No growth с.
    - EPD 3rd Party Certified d.
    - HPD 3rd Part Certified e.
    - NSF/ANSI 342 Certified to Wallcovering Association Sustainability Standard f.

- 6. Design: a. Pat
  - Pattern: Select from Ricochet<sup>TM</sup> pattern selection.
    - 1) Color: Select from Ricochet<sup>TM</sup> color palette.
- B. Rigid Sheet Vinyl (W3): Equal to Inpro Corp. Rigid Sheet Vinyl, conforming with the following:
  - 1. Palladium® Rigid Vinyl Sheet
    - a. Item No. 306,  $3^{5}x 8^{2}$ , .060'' = 1/16''
    - b. Vinyl: Palladium® Rigid Vinyl Sheet Elements Style shall be manufactured from chemical and stain resistant polyvinyl chloride with the addition of impact modifiers. No plasticizers shall be added (plasticizers may aid in bacterial growth).
  - 2. Top caps shall be made of extruded PVC.
  - 3. Finishes:
    - a. Color or pattern of Palladium® Rigid Vinyl Sheet to be selected by the architect from the IPC Sheet finish selection. Surface shall have a velvet texture.
    - b. Vinyl Accessories: Top caps, inside corners, divider bars and outside corners shall be of a color matching the IPC.
    - c. Color or pattern of Palladium Wall Boards to be selected by the architect from the IPC finish selection. Surface shall have a velvet texture.
- C. Corner Guards: Equal to Inpro Corp. 160BN BluNose High Impact Corner Guard, conforming with the following:
  - 1. 160BN BluNose High Impact Corner Guard Profile
    - a. 2" (51 mm) x 2" (51 mm), 90 degrees
    - b. 8' (2.44 m) standard height
    - c. Custom Angles Provide vinyl covers and retainers with custom angles. Custom angles shall be between 112.5° and 157.5°. Provide flexible top caps to bend to retainer angle.
  - 2. Vinyl Covers:
    - a. Snap on cover of .080" (2 mm) thickness shall be extruded from chemical and stain resistant polyvinyl chloride with the addition of impact modifiers. No plasticizers shall be added (plasticizers may aid in bacterial growth).
    - b. Vinyl Retainers: Continuous vinyl retainers of .070" (1.8 mm) thickness with a Biopolymer Flex PVC apex shall be fabricated from polyvinyl chloride with the addition of impact modifiers.
  - 3. Top caps and bottom caps shall be made of injection molded thermoplastics.
    - a. Fasteners: All mounting system accessories appropriate for substrates indicated on the drawings shall be provided.
    - b. Optional flexible top caps shall be made of injection molded Biopolymer Flex PVC.
  - 4. Vinyl Covers: Colors of the corner guard to be selected by the architect from the IPC finish selection. Surface shall have a pebblette texture.
  - 5. Molded Components: Top caps and bottom caps shall be of a color matching the corner guards. Surface shall have a pebblette texture.

## PART 3 EXECUTION

- 3.1 EXAMINATION
  - A. Section 01 40 00 Quality Requirements: Verification of existing conditions before starting work.
  - B. Verify that field measurements are as indicated on Drawings.
  - C. Verify that rough-in for components are correctly sized and located.

## WALL PROTECTION

# 3.2 INSTALLATION

- A. Section 01 40 00 Quality Requirements: Manufacturer's instructions.
- B. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.
- C. Position base of corner guard 4 inches above finished floor.
- D. Install corner guard in single piece length for each location; except as otherwise indicated, end-to-end butt joints are not permitted.

# 3.3 ERECTION TOLERANCES

A. Section 01 40 00 – Quality Requirements: Tolerances.

# SECTION 10 44 00 FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

- PART 1 GENERAL
- 1.1 SECTION INCLUDES
  - A. Fire extinguishers
  - B. Cabinets
  - C. Accessories.

# 1.2 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Section 04 20 00 Unit Masonry: Placement of rough-in frame for cabinets.
- 1.3 RELATED SECTIONS
  - A. Section 06 11 40 Wood Blocking and Curbing: Wood blocking and shims.

# 1.4 REFERENCES

- A. ANSI/NFPA 10 Portable Fire Extinguishers.
- B. ANSI/UL 92 Fire Extinguisher and Booster Hose.
- C. ANSI/UL 711 Rating and Fire Testing of Fire Extinguishers.
- D. UL 8 Foam Fire Extinguishers.
- E. UL 154 Carbon Dioxide Fire Extinguishers.
- F. UL 299 Dry Chemical Fire Extinguishers.
- G. UL 626 2 2 Gallon Stored Pressure, Water Type Fire Extinguishers.
- H. UL 1093 Halogenated Agent Fire Extinguishers.

# 1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements, location, and mounting heights.
- C. Product Data: Provide extinguisher operational features, color and finish, and anchorage details.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

## 1.6 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01 78 20.

## FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

- B. Maintenance Data: Include test, refill or recharge schedules and recertification requirements.
- 1.7 QUALITY ASSURANCE
  - A. Provide units conforming with ANSI/UL 711.
- 1.8 REGULATORY REQUIREMENTS
  - A. Conform to ANSI/NFPA 10 for requirements for extinguishers.

# 1.9 ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

# PART 2 PRODUCTS

# 2.1 MANUFACTURERS

- A. Larsen's Product.
- B. Modern Metal Products.
- C. J.L. Industries.
- D. Substitutions: Under provisions of Section 01 60 00.

# 2.2 EXTINGUISHERS

A. MP10 Dry Chemical Type: UL 299, Cast steel tank, with pressure gage; Class4A-60B:C.

## 2.3 CABINETS

- A. Metal: Formed stainless steel; 18 gage thick base metal.
- B. Configuration:
  - 1. For MP10 Extinguisher: Equal to Larsen's SS 2409-R2 Vertical Duo Clear Acrylic Door with Larsen Loc semi-recessed type, exterior nominal dimensions of 13 inches wide x  $27 \frac{1}{2}$  inches high and rough opening depth of 6 <sup>1</sup>/<sub>4</sub> inches.
- C. Trim Type: Semi-recessed, returned to wall surface. Recess in wall must not exceed 6<sup>1</sup>/<sub>4</sub> inches.
- D. Door: 18 gage stainless steel, clear bubble break glass.
- E. Door Glazing: Plastic, clear, 1/8-inch-thick acrylic.
- F. Cabinet Mounting Hardware: Manufacturer's standard bracket.
- G. Provide rated cabinets where located in fire rated partitions.

# 2.4 ACCESSORIES

A. Extinguisher Brackets: Formed steel, chromed finish.

## 2.5 FABRICATION

- A. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim and door stiles.
- B. Pre-drill for anchors.
- C. Hinge doors for 180 degree opening with continuous piano hinge. Provide nylon roller type catch.
- D. Weld, fill, and grind components smooth.
- E. Glaze doors with resilient channel gasket glazing.

# 2.6 FINISHES

- A. Extinguisher: Steel, enamel to red color.
- B. Cabinet Exterior Trim and Door: Stainless Steel No. 4 finish.
- C. Cabinet Interior: white enamel.

# PART 3 EXECUTION

- 3.1 EXAMINATION
  - A. Verify wall openings under provisions of Section 01 31 00.
  - B. Verify rough openings for cabinet are correctly sized and located.

## 3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings, 48 inches from finished floor to inside top of cabinet.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets on wall brackets.

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# SECTION 10 80 00 TOILET AND BATH ACCESSORIES

## PART 1 GENERAL

## 1.1 SECTION INCLUDES

- A. Toilet and washroom accessories.
- B. Grab bars.
- C. Washbar.

# 1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Section 04 20 00 - Unit Masonry: Placement of concealed anchor devices.

# 1.3 RELATED SECTIONS

- A. Section 09 80 00 Tiling: Wall finishes.
- B. Section 10 21 15 Solid Color Reinforced Composite Toilet Partitions.

## 1.4 REFERENCES

- A. ANSI A117.1 Safety Standards for the Handicapped.
- B. ASTM A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- D. ASTM A269 Seamless and Welded Austenitic Stainless-Steel Tubing for General Service.
- E. ASTM A366 Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- F. ASTM B456 Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- G. NEMA LD-3 High Pressure Decorative Laminates.

# 1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

# 1.6 REGULATORY REQUIREMENTS

A. Conform to ANSI A117.1 code for access for the handicapped.

## 1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on product data and instructed by the manufacturer.

## 1.9 COORDINATION

- A. Coordinate work under provisions of Section 01 31 00.
- B. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

## PART 2 PRODUCTS

## 2.1 MANUFACTURERS

- A. Bobrick, Product as specified.
- B. Bradley, Products as specified.
- C. Other acceptable manufacturers offering equivalent products.
  - 1. A & J Washroom Accessories.
  - 2. Parker.
- D. Substitutions: Under provisions of Section 01 60 00.

## 2.2 MATERIALS

- A. Sheet Steel: ASTM A366.
- B. Stainless Steel Sheet: ASTM A167, Type 304.
- C. Tubing: ASTM A269, stainless steel.
- D. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, and security type.
- E. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

## 2.3 FABRICATION

- A. Weld and grind joints of fabricated components, smooth.
- B. Form exposed surfaces from single sheet of stock, free of joints. Form surfaces flat without distortion. Maintain surfaces without scratches or dents.
- C. Fabricate grab bars of tubing, free of visible joints, return to wall with end attachment flanges. Form bar with 1 1/2 inches clear of wall surface. Knurl grip surfaces.
- D. Shop assemble components and package complete with anchors and fittings.
- E. Provide steel anchor plates, adapters, and anchor components for installation.

## 2.4 KEYING

A. Supply six (6) keys for each accessory to Owner.

B. Master key all accessories.

# 2.5 FINISHES

- A. Galvanizing: ASTM A123 to 1.25 oz/sq. yd. Galvanize ferrous metal and fastening devices.
- B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- C. Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats electrostatic baked enamel.
- D. Chrome/Nickel Plating: ASTM B456, Type SC 2 satin finish.
- E. Stainless Steel: No. 4 satin luster finish.
- F. Back paint components where contact is made with building finishes to prevent electrolysis.

# PART 3 EXECUTION

# 3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01 31 00.
- B. Verify that site conditions are ready to receive work and dimensions are as indicated on shop drawings and instructed by the manufacturer.
- C. Verify exact location of accessories for installation.

## 3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

# 3.3 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions and ANSI A117.1.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- 3.4 SCHEDULE (See drawings for locations).

1.	Toilet Paper Dispenser – Double Roll	Bobrick B-2740
2.	Waste Receptacle	Bobrick B-277
3A.	Grab Bars (Toilet):	
	a. 36" Grab Bar	Bobrick B-6806-36
	b. 42" Grab Bar	Bobrick B-6806-42
4.	Sanitary Napkin Disposal	Bobrick B-35303
5.	Robe Hook:	Bobrick B-76717
6.	Baby Changing Station	Koala Kare KB-200-0155 Grey
7.	Mop Rack w/shelf	Bobrick B-224 x 30
8.	Mirrors (W x H)	
	a. 7'-6" x 3'-6"	Bobrick B-1556 2436
9.	Washbar (Soap, water & hand dryer)	Bradley LVQD3
	(to be used with Evero Basin, Color: Mykonos)	

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# SECTION 11 42 00 COMMERCIAL KITCHEN EQUIPMENT

# PART 1 GENERAL

## 1.01 SECTION INCLUDES:

A. Commercial Kitchen Equipment: For rough-in requirements refer to plan for equipment locations.

# 1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Division 23 Mechanical: Connection of Utilities
- B. Division 26 Electrical: Connection of Utilities

## 1.03 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Submit shop drawings indicating cabinetry, appliances and utility requirements.
- C. Submit product data under provisions of Section 01 33 00.
- D. Submit product data for dock guards, display cases, appliances, athletic equipment and projection screens.
- E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

# 1.04 OPERATION AND MAINTENANCE DATA

- A. Submit operation data under provisions of Section 01 78 20.
- B. Submit maintenance data under provisions of Section 01 78 20.
- C. Include cleaning and stain removal methods and recommended cleaning materials, polishes and waxes.

# 1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site under provisions of Section 01 60 00.
- B. Store and protect products under provisions of Section 01 60 00.

## 1.06 WARRANTY

- A. Provide Manufacturers' standard warranties under provisions of Section 01 77 00.
- B. Warranty: Include coverage for replacement parts and repair labor to correct defects in workmanship and materials. Provide a five (5) year warranty, parts and labor, on refrigerator.

# COMMERCIAL KITCHEN EQUIPMENT

# 1.07 SUBSTITUTIONS

A. Substitutions shall be in accordance with Section 01 60 00.

# PART 2 PRODUCTS

- 2.01 COMMERCIAL KITCHEN EQUIPMENT (By others unless noted otherwise Contractor to provide rough-in)
  - A. Reach-In Refrigerator:
    - 1. Model: Continental Refrigerator Model 1R
    - 2. Description: Refrigerator, reach-in, one-section, 20 cu. ft., self-contained refrigeration, stainless steel front, aluminum interior and ends, standard depth, full-height solid door, electronic control with digital display, hi-low alarm, electric condensate evaporator, 1/4 HP, cETLus, NSf, Made in USA.
    - 3. Warranty: Standard warranty: 3-year parts and labor, 5-year compressor
    - 4. 115v/60/1-ph, 5.5 amps, cord, NEMA 5-15P, standard
    - 5. Door hinge on right, standard.
    - 6. 5" casters, standard
    - 7. Quantity: One (1)
  - B. Reach-In Undercounter Freezer:
    - 1. Model: Continental Refrigerator Model SWF32-U
    - 2. Description: Undercounter Freezer, 32" W, 9.0 cu. ft. capacity, one-section, (1) field rehinge able door, stainless steel front, top and end panels, aluminum interior, 1-3/8" diameter plate casters, front breathing, electronic control with digital display, hi-low alarm, rear-mounted self-contained refrigeration, R290 Hydrocarbon refrigerant, 1/3 HP, cETLus, NSF, Made in USA.
    - 3. Warranty: Standard warranty: 3-year parts and labor, 5-year compressor
    - 4. 115v/60/1-ph, 5.6 amps, cord, NEMA 5-15P, standard
    - 5. Quantity: One (1)
  - C. Range, 36", 6 Open Burners:
    - 1. Model: Vulcan Model 36S-6B
    - 2. Description: Endurance Restaurant Range, ga, 36", (6) 30,000 BTU burners, lift-off burner heads, standard oven, stainless steel front, sides, backriser, and lift-off high shelf, fully MIG welded chassis, 6" adjustable legs, 215,000 BTU, CSA, NSF
    - 3. Warranty: 1 year limited parts and labor warranty, standard
    - 4. Gas type to be specified.
    - 5. Stainless steel backriser and lift-off high shelf, standard
    - 6. Quantity: One(1)
  - D. Exhaust Hood: (ByContractor)
    - 1. Refer to drawings.
  - E. Underbar Sink Units:
    - 1. Model: John Boos Model EUB3S72-2D
    - Description: Underbar sink unit, 3-compartment, 72"W x 21"D x 32-1/2"H overall size,
      (3) 10"W x 14" front to back x 10" deep compartments, (2) 19" left and right ribbed drainboards, 3"H backsplash, (1) set of deck mount faucet holes with 4" centers, includes

faucet (PDF-4-D-10), raised marine edge on front and sides, stainless steel apron on front & sides, includes 1-1/2" drains and overflow stand pipes (PB-OVF-BS), 18/300 stainless steel construction, stainless steel legs and side bracing, adjustable plastic bullet feet, NSF, CSA-Sanitation (weights are subject to additional packaging).

F. Underbar Sunk Units:

1

- Model: John Boos Model EUBS-1521STD
  - a. Model PBF-4SM2-5GLF Heavy Duty Faucet, shallow splash mounted, 4" centers, 5" gooseneck spout, with 1/2" NPT (LEAD FREE FAUCET)
  - b. Model PB-WL-36 Flexible water line connectors for shallow mount faucets, (2) houses per kit, (1) red for hot and (1) blue for cold.
- Description: Underbar Dump Sink, freestanding, 15"W x 21"D x 33-1/2"H overall size, (1) 10"W x 12" front to back x 6" deep compartment, 4"H backsplash, (1) set of splash mount faucet holes with 4" centers, deck mount soap dispenser, front and end panels, aluminum back and interior, electronic control with digital display, hi-low alarm, rear mounted self-contained refrigeration, 1/5 hp, cETLus, NSF, Made in USA.
- G. Sandwich/ Salad Preparation Refrigerator:
  - 1. Model: Continental Refrigerator Model SW27-8
  - 2. Description: Sandwich Unit, 27"W, 7.4 cu. ft. capacity, one-section (8) 1/6 size x 4" deep pans with 12" cutting board, (1) field rehingeable door, stainless steel top, front and end panels, aluminum back and interior, electronic control with digital display, hi-low alarm, rear mounted self-contained refrigeration, 1/5 hp, cETLus, NSF, Made in USA.
  - 3. Warranty: Standard warranty: 3 year parts and labor, 5 year compressor
  - 4. 115v/60/1-ph, 6.3 amps, cord, NEMA 5-15P, standard
  - 5. Casters, 5" standard
  - 6. Quantity: One (1)
- H. Ice Cuber with Bin:
  - 1. Model: Manitowoc Model UDF-0140A
  - 2. Description: NEO Undercounter Ice Maker, cube-style, air-cooled, self-contained, 26"W x 28"D x 38-1/2"H, production capacity up to 135 lb./ 24 hours at 70%/50% (95 lb. AHRI certified at 90%/70%), 90 lb. ice storage capacity, electronic controls, dice size cubes, 6" adjustable legs with flanged feet (painted gray), 0.42 HP, NSF, cULis, CE
  - 3. Model WARRANTY-ICE-SC 3 year parts and labor (Machine), 5 year parts and labor (Evaporator), 5 year parts and labor (Compressor), standard.
  - 4. Model AR-10000 Artic Pure Primary Water Filert Assembly, includes head, shroud, hardware, mounting assembly, and (1) filter cartridge, 14,000 gallon capacity, 0-600 lbs./ ice per day.
  - 5. Model WARRANTY-ARCPURE 3 year parts and labor warranty on cap, housing, hardware, and mounting assembly (does not refer to filter cartridge), standard.

# PART 3 EXECUTION

# 3.01 EXAMINATION

- A. Verify that openings are ready to receive work.
- B. Verify field measurements are as shown on shop drawings.

# COMMERCIAL KITCHEN EQUIPMENT

- C. Verify that required utilities are available, in proper locations, and ready for use.
- D. Beginning installation means installer accepts existing substrate conditions.

# 3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

# 3.03 CLEANING

A. Clean work under provisions of Final Cleaning.

# 3.04 **PROTECTION**

A. Protect finished installation under provisions of Section 01 50 00.

## SECTION 12 20 00 WOVEN ROLLER SHADES

# PART 1 GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Manually operated roller shades.
- B. Products Supplied but Not Installed Under This Section:
  - 1. Metal shade pockets or housings recessed into ceiling system or assembly.
  - 2. Extruded aluminum ceiling pocket trim (closure) assemblies.
- C. Related Sections:
  - 1. Section 06 11 40 Wood Blocking and Curbing: Blocking for support of window shade brackets or pocket assemblies.
  - 2. Section 08 41 00 Aluminum Framed Storefronts.
  - 3. Section 08 44 13 Glazed Aluminum Curtainwall
  - 4. Section 09 26 00 Gypsum Board Systems: Substrate for window shade systems and installation of shade pockets, pocket closure and/ or accessories supplied only under this section.

## 1.2 PERFORMANCE REQUIREMENTS

- A. Fire: Provide shade fabrics tested in accordance with:
  - 1. 1989 NFPA 701 small scale Vertical Burn Test and rated "PASS."
  - 2. 1996 NFPA 701 small scale Vertical Burn (telephone booth test) and rated "PASS."
- B. Toxicity: Provide shade fabrics tested in accordance with University of Pittsburgh Toxicity Protocol including LC50 analysis and toxicity characteristics.
- C. Anti-microbial:
  - 1. ASTM G-22-80 results for ATCC6538 (*Staphylocaoccus aureus*) and ATCC13388 (*Psuedomonas aeroginosa*) indicating minimum 5mm (0.197 inches) 'No Growth Contact Area'.
  - 2. ASTM G-21-85 results for ATCC9642, ATCC9644, ATCC9348 and ATCC9645 indicating 'No Growth'.

## 1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets, performance data, and installation instructions for each item required per section 01 33 00.
- B. Shop Drawings:
  - 1. Interior Elevations at  $3/8^{"} = 1^{-0"}$  scale min indicating shade layout, seam / batten locations and coordination with surrounding conditions.
  - 2. Floor plans or reflected ceiling plans showing overall arrangement of shades and control locations.
  - 3. Head, Jamb and sill details as necessary to coordinate work with surrounding conditions and construction.
  - 5. Shade schedule coordinating room number, window type, opening size(s), quantities and key to details.

- C. Samples:
  - 1. Selection samples:
    - a. 3" X 5" (76 mm x 127 mm) shadecloth fabric swatches for initial fabric color selection from manufacturer's full range of available fabrics.
    - b. Standard aluminum finish color samples from manufacturer's range of standard colors.
  - 2. Verification samples:
    - a. One fully operational window shade sample of each type required 30" X 30" (760 mm x 760 mm) complete with selected shadecloth including sample of seam / batten when applicable. Disassemble sample to demonstrating compliance with PART 2.
    - b. One complete set of all shade components, unassembled, demonstrating compliance with PART 2.
- D. Design Data, Test Reports, Certificates: Current reports from independent testing laboratories demonstrating compliance with article 1.2.
- E. Manufacturers' Instructions: Manufacturer's standard installation instructions.

# 1.4 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturer: 20 years minimum experience manufacturing products comparable to those specified in this section.
  - 2. Installer: 20 years minimum experience installing products comparable to those specified in this section.
- B. Field Samples: Install large size sample of selected fabric for final verification of color, weave and density, in opening as directed by design professional.
- C. Do not fabricate shades without obtaining field dimensions for each opening. Coordinate construction of surrounding conditions to allow for timely field dimension verification.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection:
- B. Do not deliver items to the project until all concrete, masonry, plaster, painting and other wet work has been completed and is dry.
- C. Deliver shades to project in labeled protective packaging. Uniquely labeled to identify each shade for each opening. Schedule delivery to prevent delays to completion of work but to minimize on site storage time.
- D. Store materials in a dry secure place. Protect from weather, surface contaminants, corrosion, construction traffic and all other potential damage.

## 1.6 WARRANTY

- A. Special Warranty:
  - 1. Manual Operating Components: Provide Manufacturer's warranty under provisions of Division 1 General Requirements. Warranty period to be <u>10 years</u> from Date of Substantial Completion and contain provisions that installation is to remain operational without fault for the warranty period and include all operating parts, including shadecloth, except for the bead chain which is not covered by the warranty and is deemed to be a maintenance / service item.

- Installation: Provide Contractor's warranty under provisions of Division 1
  General Requirements that installation shall be free from defects for a period of not less than 2 years after substantial completion.
- 3. In the event of a warranted product failure, the Shade Contractor will, at no cost to owner, facilitate acquisition and delivery of all necessary components to the owner.

# PART 2 PRODUCTS

# 2.1 MANUFACTURERS

- A. Mechsystems Inc. (Basis of Design)
- B. Hunter Douglas
- C. Mechoshade Systems, Inc.
- D. Substitutions: Under provisions of Section 01 60 00.

## 2.2 SHADE BANDS

- A. Shade Bands: Construction of shade band includes the fabric, the enclosed hem weight, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
  - 1. Concealed Hembar: Shall be continuous extruded aluminum for entire width of shade band and with the following characteristics:
    - a. Hembar shall be heat sealed on all sides.
    - b. Open ends shall not be accepted.
  - 2. Shade Band and Shade Roller Attachment:
    - a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection.
    - b. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snapoff" spline mounting, without having to remove shade roller from shade brackets.
    - c. Mounting Spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
    - d. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets, does not meet the performance requirements of this specification and shall not be accepted.

# 2.3 ROLLER SHADE FABRICATION

- A. Fabricate shade cloth to hang flat without buckling or distortion. Fabricate with heat- sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design.
- B. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shade bands. Contractor shall be responsible for assuring the width-to- height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll- formed stainless steel or tempered steel, as required.

- C. For railroaded shade bands, provide seams in railroaded multi-width shade bands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, assure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shade bands
- D. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shade bands.
- E. Blackout shade bands, when used in side channels, shall have horizontally mounted, rollformed stainless steel or tempered-steel battens not more than 3 feet (115 mm) on center extending fully into the side channels. Battens shall be concealed in an integrally colored fabric to match the inside and outside colors of the shade band, in accordance with manufacturer's published standards for spacing and requirements.
  - 1. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.

# 2.4 ROLLER SHADE COMPONENTS

- A. Access and Material Requirements:
  - 1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
  - 2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
  - 3. Use only Delran engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester shall not be accepted.
- B. Manual Operated Chain Drive Hardware and Brackets:
  - 1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
  - 2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
  - 3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
  - 4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer's design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.
  - 5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.
  - 6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable.
  - 7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.

- 8. Drive Bracket / Brake Assembly:
  - a. MechoShade Drive Bracket model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, room darkening side / sill channels, center supports and connectors for multi-banded shades.
  - b. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
  - c. The brake shall be an over running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
  - d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non- jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
  - e. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
- 9. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

# 2.5 SHADECLOTH

- C. Visually Transparent Single-Fabric Shadecloth: MechoSystems, EuroTwill®, "Reversible, BrokenTwill", "6450" Series: 0.010 diameter (0.254 mm), Opaque, nonraveling vinyl/polyester yarn, fabric thickness 0.025 inches (0.635 mm).
  - 1. Dense BrokenTwill Weave "6450" series, 3 percent open.
  - 2. Color: Selected from Manufacturers standard colors.

## 2.6 ROLLER SHADE ACCESSORIES

## A. Fascia:

- 1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
- 2. Fascia shall be able to be installed across two or more shade bands in one piece.
- 3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
- 4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.

# PART 3 EXECUTION

## 3.1 EXAMINATION

A. Examine substrate and conditions for installation. Do not commence installation until conditions are satisfactory. Commencement of installation indicates acceptance of site conditions by Contractor. Notify the Design Professional upon inspection when the project conditions are unacceptable for shade installation. "Beginning of installation" means acceptance of substrate and project conditions.

## 3.2 INSTALLATION

A. Install units to comply with the Manufacturer's instructions for the type of mounting and operation required. Provide units plumb, true, and securely anchored in place with recommended hardware and accessories to provide smooth operation without binding.

- B. Install units within the following tolerances:
  - 1. Maximum variation of gap at window opening perimeter: 1/4 inch, per 8 feet (+/- 1/8 inch) of shade height.
  - 2. Maximum offset from level: 1/16 inch per 5 feet of shade width.

# 3.3 ADJUSTING

A. Adjust drive / brake mechanism of units for smooth operation. Adjust shade and shade cloth to hang flat without buckling or distortion. Replace any units or components which do not hang properly or operate smoothly.

# 3.4 CLEANING

- A. Touch up damaged finishes and repair minor damage in order to eliminate evidence of repair. Remove and replace work that cannot be satisfactorily repaired.
- B. Clean exposed surfaces, including metal and shade cloth, using non-abrasive materials and methods recommended by the Shade cloth Manufacturer. Remove and replace work which cannot be satisfactorily cleaned.

# 3.5 DEMONSTRATION

A. Demonstrate operation method and instruct Owner's personnel in the proper operation and maintenance of the window shade systems.

# 3.6 ROLLER SHADE SCHEDULE

- A. Roller Shade Schedule:
  - 1. Room 129-Conference and Room 128-Office.