

PROJECT MANUAL

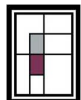
ADMINISTRATION & TRAINING CENTER TRI COUNTY BOARD OF RECOVERY & MENTAL HEALTH

1280 N. County Road 25-A
Troy, Ohio 45373

Project #1615.04

Rebid Specifications

May 12, 2021



FREYTAG & ASSOCIATES INC.
ARCHITECTS ENGINEERS

226 North Miami Avenue
P.O. Box 220
Sidney, Ohio 45365.

(937) 492-6983

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SECTION 000020 - NOTICE TO BIDDERS

Sealed Bid Proposals will be received at the Tri-County Board of Recovery and Mental Health Office, 1100 Wayne St., Suite 4000, Troy, Ohio 45373 until 4:00 PM (local time) Tuesday, June 8, 2021 at which time and place the Bid Proposals will be opened publicly and read aloud. Bids received after 4:00 PM (local time) will be returned unopened.

Bid Proposals shall be for the furnishing of materials and the performance of labor necessary for the construction of:

NEW ADMINISTRATION & TRAINING CENTER
TRI-COUNTY BOARD OF RECOVERY & MENTAL HEALTH SERVICES
1280 N. County Road 25-A
Troy, Ohio 45373

all in accordance with the Contract Documents prepared by Freytag and Associates, Inc., 226 North Miami Avenue, Sidney, Ohio 45365.

A Lump Sum Bid will be received that includes the following categories of work:

General Construction including Plumbing, Mechanical, Electrical, Fire Protection and Site Work.

The estimated cost for the above listed Work is \$4,200,000.

A pre-bid meeting will be held on May 18, 2021 at 2:00 PM at the following location:

Tri-County Board of Recovery and Mental Health Office
1100 Wayne St.
Suite 4000
Troy, Ohio 45373

A Bid Security in the form of a certified check, cashier's check, letter of credit, or surety company bond pursuant to Chapter 1305 of the Ohio Revised Code in the amount of 10% of the total bid shall accompany each bid; or a bid guaranty bond in accordance with Chapter 153.571 of the Ohio Revised Code in the amount of 100% of the total bid shall accompany each bid. If a bid security in the amount of 10% of the full bid amount is submitted with this bid, each successful bidder is required to furnish a Performance Bond and Labor and Material Bond from an acceptable surety in the amount of 100% of the full contract amount in accordance with Section 153.57 of the Ohio Revised Code. If a bid guaranty bond in the amount of 100% of the total bid is submitted with the bid, no additional Performance and Labor and Material Bond is required to be furnished by the successful Bidder.

Successful bidders shall conform to the "Schedule of Prevailing Wages" included in the Project Manual.

The Contract Documents, including Drawings and Specifications, are on file for public inspection at the office of the Architect. Bidders may purchase copies of the Contract Documents through ARC. Printing and shipping costs will be the responsibility of the contractor obtaining the contract documents from the printer. The preferable mode of ordering is through ARC website, or by contacting the printing company below.

ARC
www.e-arc.com/oh/dayton
424 E. 3rd St.
Dayton, OH 45402

Phone: (937) 277-7930
Fax: (937) 277-7937
Brian Markland, Customer Service Manager

The Owner reserves the right to reject each and every bid, and to waive informalities, irregularities, and errors in the bidding to the extent permitted by law. This includes the right to extend the date and time for receipt of bids.

Each bid must be submitted in duplicate on the Bid Proposal Form included in the Project Manual. Place both copies in a sealed opaque envelope. Mark plainly on the outside of the envelope the title of the Project, name of the bidder, and the category/categories of work being bid in the upper left hand corner. No bidder may withdraw their bid for a period of sixty (60) days after the opening thereof.

Questions for this Project shall be directed to:

Adam Freytag
Phone (937) 492-6983
Fax (937) 492-7576
Email afreytag@freytaginc.com

BY ORDER OF
Tri-County Board of Recovery and Mental Health

Advertising Dates: May 14
May 21
May 28

SECTION 000100 - INSTRUCTIONS TO BIDDERS

PART 1: GENERAL

1.1 BIDDER'S PLEDGE AND AGREEMENT

- A. Each Bidder acknowledges that this is a public project involving public funds and that the Owner expects and requires that each successful Bidder adhere to the highest ethical and performance standards. Each Bidder by submitting a bid pledges and agrees that (a) it will act at all times with absolute integrity and truthfulness in its dealings with the Owner and the Design Professional, (b) it will use its best efforts to cooperate with the Owner and the Design Professional and all other Contractors on the Project and at all times will act with professionalism and dignity in its dealings with the Owner, Design Professional, and other Contractors, (c) it will assign only competent supervisors and workers to the Project, each of whom is fully qualified to perform the tasks that are assigned to him/her, and (d) it has read, understands and will comply with the terms of the Contract Documents.

1.2 SUMMARY

- A. Sealed Bids will be received for the

New Administration & Training Center
Tri-County Board of Recovery & Mental Health Services,
1280 N. County Road 25-A
Troy, Ohio 45373

all in accordance with the Contract Documents prepared by Freytag and Associates, Inc., 226 North Miami Avenue, Sidney, Ohio 45365.

Design Professional Representative: Adam Freytag, Phone: 937-492-6983, Email: afreytag@freytaginc.com.

- B. The Contract Documents, including Drawings and Specifications, are on file for public inspection at the office of the Architect. Bidders may purchase copies of the Contract Documents through ARC. Printing and shipping costs will be the responsibility of the contractor obtaining the contract documents from the printer. The preferable mode of ordering is through ARC website, or by contacting the printing company below:

ARC
www.e-arc.com/oh/dayton
424 E. 3rd Street
Dayton, OH 45402
Phone: (937) 277-7930
Fax: (937) 277-7937
Kurt Kelley, Customer Service Manager

1.3 DEFINITIONS OF TERMS

- A. Whenever the term "Owner" or "Board" occurs in the Specifications or other documents, it shall mean the Tri-County Board of Recovery and Mental Health or the Owner's Representatives.
- B. Whenever the term "Contractor" occurs in the Specifications or other documents, it shall mean a person, firm or corporation contracting with the Owner to supply labor, materials, or equipment or all for the Project.

- C. Whenever the term "Architect" or "Associate" occurs in the Specifications or other documents, it shall mean Freytag & Associates, Inc.

1.4 EXAMINATION OF CONTRACT DOCUMENTS AND SITE OF WORK

- A. Each Bidder shall have a competent person carefully and diligently review each part of the Contract Documents, including the Divisions of the Specifications and parts of the Drawings that are not directly applicable to the Work on which the Bidder is submitting its bid. By submitting its bid, each Bidder represents and agrees, based upon its careful and diligent review of the Contract Documents, that it is not aware of any conflicts, inconsistencies, errors, or omissions in the Contract Documents for which it has not notified the Design Professional in writing at least ten (10) days prior to the bid opening. If there are any such conflicts, inconsistencies, errors, or omissions in the Contract Documents, the Bidder (i) will provide the labor, equipment, or materials of the better quality or greater quantity of Work and/or (ii) will comply with the more stringent requirements. The Bidder will not be entitled to any additional compensation for any conflicts, inconsistencies, errors, or omissions that would have been discovered by such careful and diligent review, unless it has given prior written notice to the Design Professional.
- B. The submission of a Bid shall be considered evidence that the Bidder has made such examination and is satisfied as to the site conditions to be encountered, in performing the work and as to all the requirements of the Contract Documents. No allowance will be made for lack of knowledge concerning such conditions after the Contract is signed.
- C. Each Bidder shall have a competent person carefully and diligently inspect and examine the entire site and the surrounding area, including all parts of the applicable to the Work for which it is submitting its bid, including location, existing conditions, site layout and the location of utilities, and carefully correlate the results of the inspection with the requirements of the Contract Documents. The Bidder's bid shall include all costs attributable to site, and surrounding area conditions that would have been discovered by such careful and diligent inspection and examination of the site, and surrounding area, and the Bidder shall not be entitled to any Change Order, additional compensation, or additional time on account of such conditions.
- D. The Bidder may rely upon the general accuracy of any technical data identified in the Owner-Contractor Agreement (e.g., any soils exploration reports, soil boring logs, site survey, or abatement reports) in preparing its bid, but such technical data are not part of the Contract Documents. Except for the limited reliance described in the preceding sentence, Bidder may not, if awarded a contract for the Work, rely upon or make any Claim against the Owner or Design Professional, or any of their agents or employees, with respect to any of the following:
 - 1. The completeness of such reports and drawings for Bidder's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by the successful Bidder and safety precautions and programs incident thereto; or
 - 2. any interpretation by the successful Bidder of or conclusion drawn from any technical data or any such other data, interpretations, opinions, or information. For example, all interpolations and extrapolations of data performed by the Bidder to estimate locations or quantities of subsurface strata are independent factual assumptions, which Owner does not warrant.
- E. Each Bidder will be deemed to have actual knowledge of all information provided or discussed at the pre-bid meeting.

1.5 PRE-BID CONFERENCE: None Scheduled.

1.6 THE WORK

- A. Only one contract will be issued by the Owner for constructing the Project, the General Contract, which will cover all scopes of work necessary to construct the Project.
- B. The Contractor awarded the General Contract (General Contractor) will be responsible for the performance and coordination of any and all subcontractors and suppliers either directly or indirectly contracted with the General Contractor.

1.7 ADDENDA AND INTERPRETATIONS

- A. The Owner reserves the right to modify the scope of the work to within three days of the scheduled date for the opening of Proposals.
- B. Discrepancies or ambiguities in, or omissions from, the Contract Documents shall be immediately brought to the attention of the Architect. If no questions are raised, the solution to Contract Document's discrepancies, ambiguities, or omissions with the greatest costs shall be assumed included into the Contractor's bid.
- C. Changes in the scope of work and any clarifications to the Contract Documents will be issued to all Bidders of record in the form of a written addendum.
- D. Addenda, if any, will be considered as a part of the Contract Documents and acknowledgment of receipt of same must be included with the Bid Proposal Form when it is presented.
- E. Neither the Owner, Owners Representative, nor the Architect will be responsible for oral interpretations. Bidders shall submit written questions to Adam Freytag, Freytag & Associates, Inc., by 12 noon at least 5 calendar days prior to the deadline to submit bids to allow sufficient time for the Design Professional to respond. All Addenda will be issued, except as hereafter provided, and e-mailed or otherwise furnished to person.
- F. If a Bidder contemplating submitting a bid for the proposed Project is in doubt as to the true meaning of any part of the Contract Documents, it may submit a written request for an interpretation to Adam Freytag, Freytag & Associates, Inc. by the deadline for questions per item E. above. Any interpretation of the proposed documents will be made by Addendum only, duly signed by the Design Professional, and a copy of such Addendum will be mailed or delivered to each Bidder receiving a set of Contract Documents and each plan room where the Contract Documents are maintained. The Owner will not be responsible for any other explanation or interpretation of the proposed documents.
- G. In interpreting the Contract Documents, words describing materials that have a well-known technical or trade meaning, unless otherwise specifically defined in the Contract Documents, shall be construed in accordance with the well-known meaning recognized by the trade.
- H. If a Bidder fails to indicate receipt of all Addenda through the last Addendum issued by the Design Professional on its Bid Form, the bid of such Bidder will be deemed to be responsive only if:
 - 1. The bid received clearly indicates that the Bidder received the Addendum, such as where the Addendum added another item to be bid upon and the Bidder submitted a bid on that item; or

2. The Addendum involves only a matter of form or is one which has either no effect or has merely a trivial or negligible effect on price, quantity, quality, or delivery of the item bid upon.

1.8 APPROVED EQUALS AND SUBSTITUTIONS

- A. Certain brands of material or apparatus are specified. Each bid will be based on these brands, which may be referred to in the Contract Documents as Standards. The use of another brand (referred to as a substitution or proposed equal in the Contract Documents, when a bidder or the contractor seeks to have a different brand of material or apparatus than that specified and approved by the Owner for use in the Project) may be requested as provided herein.
- B. Where one or several manufacturers are specified by name for one use, and the term "or an approved equal" is not used, select for use the one or any one of those manufacturers specified.
- C. Where the term "or an approved equal" is used, the Contractor may incorporate in the Bid equipment and materials that are equal to the manufactured item specified. However, after the awarding of the Contract, such item of equipment or materials must be approved by the Architect on the basis of their individual merits as "approved equals" to the items specified. If approval is not granted, the Contractor shall use the material or equipment specified.
- D. Bidders wishing to obtain approval to bid non-specified products shall submit written requests to the Design Professional a minimum of ten (10) calendar days before the bid date and hour. To facilitate the submission of requests, a Pre-Bid Substitution Form is included in the Contract Documents. The Bidder shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution, including the name of the proposed manufacturer and/or product and a complete description of the proposed product including manufacturer's name and model number or system proposed, drawings, product literature, performance and test data, color selections or limitations, and any other information necessary for evaluation. Include a statement including any changes in other materials, equipment, or other work that would be required if the proposed product is incorporated in the materials, equipment, or other work that would be required if the proposed product is incorporated in the work. The burden of proof of the merit of the proposed product is on the proposer. The Design Professional's decision on approval of a proposed product will be final.

The following will be cause for rejection of a proposed substitution:

1. Requests submitted by subcontractors, material suppliers, and individuals other than Bidders;
 2. Requests submitted without adequate documentation;
 3. Requests received after the specified cut-off date.
- E. All major substitutions for any material, articles or process shall be made before awarding of the Contract, by the Owner. Later minor substitutions shall be made only with the written approval of the Architect when such substitutions will obtain a better job or speed the time of completion.
 - F. In proposing a non-specified product or a substitution, the Bidder represents and warrants that each proposed product will not result in any changes to the Project, including changes to the Work of other contractors, or any decrease in the performance of any equipment or systems to be installed in the Project and agrees to pay any additional costs incurred by the Owner and the Owner's consultants as a result of a non-specified or substitute product that is accepted.

- G. Following the award of the Contract, there shall be no substitutions for specified products, except pursuant to a Change Order. The Owner in its sole discretion may decline to consider a substitution for a Change Order.

1.9 BIDDERS QUALIFICATIONS

- A. Each Bidder under consideration of Contract award shall submit to the Architect upon request, AIA Document A305 – Contractor’s Qualification Statement and include corresponding supplement document, and when specifically requested by the Owner, a detailed financial statement.
- B. The Owner shall have the right to take such steps as it deems necessary to determine the ability of the Bidder to perform the obligations under the Contract, and the Bidder shall furnish the Owner all such information and data for this purpose as requested. The right is reserved to reject any bid where an investigation of the available evidence or information does not satisfy the Owner that the Bidder is qualified to carry out properly the terms of the Contract.

1.10 SUBCONTRACTORS

- A. The Bidder shall submit a complete list of names and addresses of the subcontractors contemplated for use on the Project within 24 hours of a request by the Owner.
- B. The Architect and Owner must approve all subcontractors, prior to award of the Contract.
- C. Although such approval will not be withheld arbitrarily, subcontractors that have proven unsatisfactory in the past, or do not have adequate manpower and plant to perform the work, will not be accepted.
- D. After subcontractors have been approved and agreements signed, no changes in the subcontractors shall be made without written approval of the Architect and Owner.

1.11 BONDS AND GUARANTEES

- A. All Bid Guaranties must be satisfactory to the Owner.
- B. The Bid Guaranty and Contract Bond meeting the requirements of [Section 153.54 \(B\) of the Ohio Revised Code](#) shall be used without change of wording.
- C. The amount of the Bid Guaranty and Contract Bond must be for the full amount of the Bid including all add alternates.
- D. The Bid Guaranty and Contract Bond must be signed by an Authorized Agent of an acceptable Surety Bonding Company and by the Bidder. The Bid Guaranty and Contract Bond must be countersigned by a Resident Agent of the Bonding Company as required by [Section 5729.09 of the Ohio Revised Code](#). (Affix Corporate Seals to all copies). The name and address of both the Surety and Surety's Agent must appear on Bid Guaranty.
- E. Bid Guaranties and Contract Bonds must be supported by credentials showing the Power of Attorney of the Agent.
- F. In lieu of the Bid Guaranty and Contract Bond referred to above, the Bidder may submit the Bid Guaranty provided in Division (C) of Section 153.54 of the Revised Code in the form of a Certified Check, Cashier's Check, or Letter of Credit pursuant to [Chapter 1305 of the Ohio Revised Code](#).

- G. The amount of the Certified Check, Cashier's Check or Letter of Credit shall be equal to ten percent (10%) of the Bid.
- H. The Bid Guaranty shall be payable to the Owner.
- I. Bid Guaranties will be returned to all unsuccessful Bidders after the Contract is executed.
- J. The Certified Check, Cashier's Check, or Letter of Credit shall be returned to the successful Bidder upon filing of the Bond required in [Division \(C\), Section 153.54 Ohio Revised Code](#). Successful Bidders will be required to furnish bonds and insurance in accordance with the provisions of the General Conditions and Supplementary Conditions. Executed duplicate copies of bonds and insurance certificates will be required for each set of Contract Documents.

1.12 COMPUTATION OF WAGES AND OVERTIME COMPENSATION

- A. The Bidder and each of the Subcontractors will be required to comply with all applicable Federal, State and Local laws or ordinances with respect to the hours worked by laborers and mechanics engaged in work on the Project.

1.13 PREPARATION OF PROPOSAL

- A. The Bidder shall submit the Proposal upon the forms furnished with the Contract Documents. All the words and figures shall be in ink or typewritten. Each Bidder shall submit **1 original and 1 copy** of its bid to the Owner.
- B. The Bidder's Proposal must be signed with ink by the individual, by one or more members of the partnership, or by one or more officers of a corporation, or by an agent of the Contractor legally qualified and acceptable to the Owner. If the Proposal is made by an individual, their name and business address must be shown; by a partnership, the name and business address of each partnership member must be shown; by a corporation, the name of the state under the laws of which the corporation is chartered and the name and title of the officer or officers having authority under the bylaws to sign Contracts, the name of the corporation and the business address of its corporate officials must be shown.
- C. All blank spaces shall be filled in, in ink or typewritten, in words and figures, and in figures only where no space is provided for words and signed by the Bidder. The wording on the Bid Form shall be used without change, alteration, or addition. Any change in the wording or omission of specified accompanying documents may cause the bid to be rejected. If there is an inconsistency or conflict in the bid amount, the lowest amount shall control, whether expressed in numbers or words.
- D. Bids shall be enclosed in a sealed opaque envelope with the BIDDER'S NAME, plainly marked on the outside and " TRI-COUNTY BOARD OF RECOVERY & MENTAL HEALTH SERVICES – NEW ADMINISTRATION & TRAINING CENTER PROJECT BID," addressed as follows:

Tri-County Board of Recovery and Mental Health Office
1100 Wayne St. Suite 4000
Troy, Ohio 45373
ATTN: Terri Becker, Executive Director

Bids must be received at the location designated above before 4:00 PM (local time), June 8, 2021. Hand deliveries to this location may be made between 8am and 4:30pm weekdays (closed on Federal Holidays) and must be made before the deadline. Immediately after the

time for their filing is expired, the bids shall be publicly read at the Tri-County Board of Recovery and Mental Health Offices.

- E. A foreign corporation submitting a Proposal must comply with the laws of doing business in the State of [Ohio](#), if its Proposal or any part thereof is accepted.
- F. Each Bid shall consist of the following:
 - 1. Bid Proposal
 - 2. Bid Guaranty and if applicable, Contract Bond.
 - 3. Acknowledgment of Addenda, if any.
 - 4. Contractor's Qualification Statement (See Article 1.19 Paragraph C-11 below).
- G. The attention of Bidders is especially directed to the following:
 - 1. Federal and Civil Rights Law regulating Equal Opportunity Employment and requiring Affirmative Action Policy.
 - 2. Bid Guaranty and Contract Bond requirements.
 - 3. Statutory requirements of the State of [Ohio](#) relative to licensing of corporations organized under the laws of any other state.
- H. Materials purchased for use or consumption in connection with the proposed work will be [exempt from the State of Ohio Sales Tax as provided in Section 5739.02 of the Revised Code of Ohio and also from the State of Ohio Use Tax, Section 5741.01](#). The Tri-County Board of Recovery and Mental Health is exempt from payment of such taxes and an exemption certificate will be provided, when applicable, upon request.
- I. Purchases by the Contractor of expendable items such as form lumber, tools, oils, grease, fuel or equipment rentals, are subject to the application of the [Ohio Sales or Use Tax](#).
- J. The Bid shall be based upon the prevailing rates of wages as ascertained by the Ohio Department of Commerce, Bureau of Wage and Hour Administration for the Project location as provided in Section 4115.03 through 4115.14, ORC and as included in these Specifications.

1.14 DELIVERY OF PROPOSALS

- A. The Proposal shall submitted per Article 1.13, Paragraph D above. Proposals will be received until the hour and date set for the opening thereof and must be in the hands of the official indicated by such time.
- B. Proposals received after the time for the opening of Bids will be returned to the Bidder unopened.

1.15 MODIFICATION/WITHDRAWAL OF PROPOSALS

- A. Modification. A Bidder may modify its bid by written communication to the Owner addressed to the Owner's Representative at any time prior to the scheduled closing time for receipt of bids, provided such written communication is received by Owner's Representative prior to the bid deadline. The written communication shall not reveal the bid price but should provide the addition or subtraction or other modification so that the final prices or terms will not be known until the sealed bid is opened. If the Bidder's written instructions with the change in bid reveal the bid amount in any way prior to the bid opening, the bid may be rejected as non-responsive.

- B. Withdrawal Prior to Bid Deadline. A Bidder may withdraw its bid at any time for any reason prior to the bid deadline for the opening of bids established in the Request for Bids. The request to withdraw shall be made in writing to and received by the Owner's Representative prior to the time of the bid opening.
- C. Withdrawal after Bid Deadline: All bids shall remain valid and open for acceptance for a period of at least 60 days after the bid opening; provided, however, that a Bidder may withdraw its bid from consideration after the bid deadline when all of the following apply:
 - 1. the price bid was substantially lower than the other bids;
 - 2. the reason for the bid being substantially lower was a clerical mistake, rather than a mistake in judgment, and was due to an unintentional and substantial error in arithmetic or an unintentional omission of a substantial quantity of work, labor, or material;
 - 3. the bid was submitted in good faith; and
 - 4. the Bidder provides written notice to the Owner, to the attention of the Owner's Representative, within two (2) business days after the bid opening for which the right to withdraw is claimed.
- D. No bid may be withdrawn under this provision if the result would be the awarding of the contract on another bid for the bid package from which the Bidder is withdrawing its bid to the same Bidder.
- E. If a bid is withdrawn under this provision, the Owner may award the Contract to another Bidder determined by the Owner to be the lowest responsible bidder or the Owner may reject all bids and advertise for other bids. In the event the Owner advertises for other bids, the withdrawing Bidder shall pay the costs incurred in connection with the rebidding by the Owner, including the cost of printing new Contract Documents, required advertising, and printing and mailing notices to prospective bidders, if the Owner finds that such costs would not have been incurred but for such withdrawal.

1.16 DISQUALIFICATION OF BIDS

- A. Any Bid submitted unsealed or unsigned will be disqualified and returned to the Bidder.
- B. Any of the following reasons may be considered as being sufficient for the disqualification of a Bidder and the rejection of his Proposal or Proposals:
 - 1. More than one Proposal for the same work from an individual, firm corporation under the same or different name.
 - 2. Evidence of collusion among Bidders. Participants in such collusion will receive no recognition as Bidders for any future work of the Owner until any such participant shall have been reinstated as a qualified Bidder.
 - 3. Bid prices which obviously are unbalanced.

1.17 IRREGULAR PROPOSALS

- A. Proposals will be considered irregular and may be rejected for the following reasons:
 - 1. If the Proposal is on a form other than that furnished by the Architect or if the form is altered or any part thereof is detached.
 - 2. If there are unauthorized additions, conditional or alternate Bids, or irregularities of any kind which may tend to make the Proposal incomplete, indefinite or ambiguous as to its meaning.

3. If the Bidder adds any provisions reserving the right to accept or reject an award or to enter into a Contract pursuant to an award. This does not exclude a Bid limiting the maximum gross amount of awards acceptable to any one Bidder at any one Bid letting, provided that any selection of awards will be made by the Owner.

1.18 METHOD OF AWARD

- A. All bids shall remain open for acceptance for sixty (60) days following the day of the bid opening, but the Owner may, in its sole discretion, release any bid and return the Bid Guaranty prior to that date. The Bid Guaranty shall be subject to forfeiture, as provided in the Ohio Revised Code, if a bid is withdrawn during the period when bids are being held.
- B. The Owner reserves the right to reject any, part of any, or all bids and to waive any informalities and irregularities. The Bidder expressly acknowledges this right of the Owner to reject any or all bids or to reject any incomplete or irregular bid. Bidders must furnish all information requested on or accompanying the Bid Form. Failure to do so may result in disqualification of the bid.
- C. Determination of the Lowest Responsible Bid. Subject to the right of the Owner to reject any or all bids, the Owner will award the Contract for the Work to the bidder submitting the lowest responsible bid that is responsive to the bidding requirements, taking into consideration accepted alternates. In evaluating bids, the Owner may consider the qualifications of the Bidders, whether or not the bids comply with the prescribed requirements, and alternates and unit prices, if requested, on the Bid Form. The Owner may also consider the qualifications and experience of subcontractors and suppliers. The Owner may conduct such investigations as are deemed necessary to establish the qualifications and financial ability of the Bidder and its subcontractors and suppliers. The factors the Owner may consider in determining which bid is the lowest responsible include the factors set forth below. The Owner, in its discretion, may consider and give such weight to these criteria as it deems appropriate.
 1. The Bidder's work history. The Bidder should have a record of consistent customer satisfaction and of consistent completion of projects, including projects that are comparable to or larger and more complex than the Owner's Project, on time and in accordance with the applicable Contract Documents. If the Bidder's management operates or has operated another construction company, the Owner may consider the work history of that company in determining whether the Bidder submitted the lowest responsible bid.

The Owner will consider the Bidder's prior experience on other projects of similar scope and/or complexity including prior projects with the Owner and/or Design Professional, including the Bidder's demonstrated ability to complete its work on these projects in work with the Owner and Design Professional as a willing, cooperative, and successful team member. Bringing overstated claims, an excessive number of claims, acting uncooperatively, and filing lawsuits against project owners and/or their design professionals on prior projects of similar scope and/or complexity will be deemed evidence of a Bidder's inability to work with the Owner and Design Professional as a willing, cooperative, and successful team member.

The Bidder authorizes the Owner and its representatives to contact the owners and design professionals (and construction managers, if applicable) on projects on which the Bidder has worked and authorizes and requests such owners and design professionals (and

construction managers) to provide the Owner with a candid evaluation of the Bidder's performance. By submitting its bid, the Bidder agrees that if it or any person, directly or indirectly, on its behalf or for its benefit brings an action against any of such owners or design professionals (or construction managers) or the employees of any of them as a result of or related to such candid evaluation, the Bidder will indemnify and hold harmless such owners, design professionals (and construction managers) and the employees of any of them from any claims whether or not proven that are part of or are related to such action and from all legal fees and expenses incurred by any of them arising out of or related to such legal action. This obligation is expressly intended for the benefit of such owners, design professionals (and construction managers), and the employees of each of them.

2. The Bidder's financial ability to complete the Contract successfully and on time without resort to its Surety.
 3. The Bidder's prior experience with similar work on comparable or more complex projects.
 4. The Bidder's prior history of the successful and timely completion of projects, including the Bidder's history of filing claims and having claims filed against it.
 5. The Bidder's equipment and facilities.
 6. The adequacy, in numbers and experience, of the Bidder's work force to complete the Contract successfully and on time.
 7. The Bidder's compliance with federal, state, and local laws, rules, and regulations, including but not limited to the Occupational Safety and Health Act, the Ohio Prevailing Wage laws, and Ohio ethics laws.
 8. The foregoing information with respect to each of the Subcontractors and Suppliers that the Bidder intends to use on the Project.
 9. The Bidder's participation in a drug-free workplace program acceptable to the Owner, and the Bidder's record for both resolved and unresolved findings of the Auditor of State for recovery as defined in Section 9.24 of the Ohio Revised Code.
 10. The Bidder's interest in the Project as evidenced by its attendance at any pre-bid meetings or conferences for bidders.
 11. Depending upon the type of the work, other essential factors, as the Owner may determine and as are included in the Specifications.
- D. Qualifications Statement. Each Bidder will submit with its bid a completed Contractor Qualifications Statement, which is included with the Contract Documents, and thereafter provide the Design Professional promptly with such additional information as the Design Professional may request regarding the Bidder's qualifications. A Bidder shall submit any requested additional information within 24 hours of the date on the request.
- E. The failure to submit requested information on a timely basis may result in the determination that the Bidder has not submitted the lowest responsible bid.
- F. After bid opening, within 24 hours of a request made by the Owner or Design Professional, the apparent low Bidder and any other Bidder so requested must submit the following:
1. For all subcontracts with an estimated value of at least \$20,000, a list of all Subcontractors that the Bidder will use to construct the Project, as well as an indication of whether or not the Bidder has ever worked with a proposed Subcontractor before,

including the following information for the three most recent projects on which the Bidder and each Subcontractor have worked together:

- Project Name
- Project Owner
- Subcontract Scope
- Subcontract Value
- Owner's contact name and phone number

If Bidder and a proposed Subcontractor have not worked together on at least three projects in the five years, Bidder must submit the information set forth above for the three most recent similar projects to the Project that a proposed Subcontractor has worked on.

The above Subcontractor information, as well as the information pertaining to each proposed Subcontractor, shall be used in the Owner's determination of the lowest responsible bid.

Once a Bidder identifies its proposed Subcontractors as set forth herein, and Owner makes no objections, the list shall not be changed unless written approval of the change is authorized by the Owner and Design Professional.

- G. Affidavit as to Personal Property Taxes. Each successful Bidder shall submit, prior to the time of the entry into the Contract, an affidavit in the form required by Section 5719.042, Ohio Revised Code, regarding the status of the Bidder's personal property taxes. A copy of the affidavit form is included with the Contract Documents.
- H. No Bidder may withdraw its bid within sixty (60) days after the date bids are opened. The Owner reserves the right to waive any formalities or irregularities or to reject any or all bids.
- I. The Owner reserves the right to disqualify bids, before or after opening, upon evidence of collusion with intent to defraud or other illegal practices on the part of the Bidder.
- J. Award of Contract. The award of the Contract, when required, will only be made pursuant to duly adopted resolution of the Owner.

1.19 MATERIAL GUARANTY

- A. Before any Contract is awarded, the Bidder may be required to furnish a complete statement of the origin, composition, and manufacturer of any or all materials to be used in the construction of the work together with samples, which samples may be subjected to the tests provided for in these Specifications to determine their quality and fitness for the work.

1.20 TIME OF COMPLETION

- A. Extensions of time may be granted to the Contractor for delays beyond the Contractor's control, such as severe or unusual climatic conditions, acts of God, or conditions not foreseeable before the Bid Date.
- B. By completing the Bid Proposal Form, the Contractor certifies that he/she has verified the scope of work, the availability of the required materials and the availability of skilled labor to complete the work within the time stated assuming the Owner's desired start date is realized.

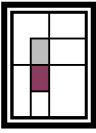
1.21 COMPLIANCE WITH APPLICABLE LAWS

- A. By submitting a bid for Work on the Project, the Bidder acknowledges that it is in compliance with applicable federal, state, and local laws and regulations, including, but not limited to, the following:
1. Equal Employment Opportunity/Nondiscrimination. The Bidder agrees that if it is awarded a contract that in the hiring of employees for performance of work under the contract or any subcontract, neither it nor any subcontractor, or any person acting on its behalf or its subcontractor's behalf, by reason of race, creed, sex, disability as defined in Section 4112.01 of the Ohio Revised Code, or color, shall discriminate against any citizen of the state in the employment of labor or workers who are qualified and available to perform work to which the employment relates. The Bidder further agrees that neither it nor any subcontractor or any person on its behalf or on behalf of any subcontractor, in any manner, shall discriminate against or intimidate any employees hired for the performance of the work under the contract on account of race, creed, sex, disability as defined in Section 4112.01 of the Ohio Revised Code, or color.
 2. Ethics Laws. The Bidder represents that it is familiar with all applicable ethics law requirements, including without limitation Sections 102.04 and 3517.13 of the Ohio Revised Code, and certifies that it is in compliance with such requirements.

1.22 DOCUMENTS REQUIRED PRIOR TO SIGNING OF CONTRACT

- B. Immediately upon the award of, and prior to the signing of the Contract, the successful Bidder shall furnish to the Architect:
1. A notarized Delinquent Personal Property Tax Affidavit as required by [Section 5719.042 of the Ohio Revised Code](#). The affidavit shall be incorporated into and made part of the Contract, and no payment shall be made with respect to the Contract unless such statement has been so incorporated as part thereof.
 2. [Ohio State Workmen's Compensation Certificate](#).
 3. Credentials showing the Power of Attorney of the Agent of the Surety.
 4. A Certificate of Compliance issued by the Division of Insurance showing the right of the bonding company to do business in the State of [Ohio](#).
 5. A Certificate from the Secretary of State showing the right of the successful Bidder to do business in the State of [Ohio](#), if said Bidder should be a Corporation not incorporated under the laws of the State of [Ohio](#).
 6. A Certificate of Insurance with coverage as specified in the Supplementary General Conditions covering the period of time the work will be in progress.
 7. Other items identified SECTION 006000 - Project Forms and SECTION 000800 Supplemental Conditions.

END OF SECTION 000100



May 12, 2021

**Tri County Board of Recovery and Mental Health
Administration and Training Center**

Scope of Changes for Re Bid

Architectural / Structural:

1. Garage:

- a. Deleted rainscreen sub framing and continuous insulation.
- b. Changed spray foam insulation to faced fiberglass insulation. Attic insulation installed at bottom of truss.
- c. Changed gypsum board sheathing to 5/8" exterior plywood sheathing.
- d. FRTW is not required for lumber used on garage.
- e. Revised roof edge detail for garage.

General:

1. Added note on Structural Drawings allowing Contractor choice of FRTW truss system or light gauge steel steel truss system.
2. Updated spray foam insulation notes on roof and wall sections to closed cell.

Plumbing:

1. Changed toilet room lavatories to wall hung vitreous china.

HVAC:

1. Included additional Equipment Manufacturers.
2. Louvers: HVAC to furnish, GC to install.

Electrical:

1. Change copper to aluminum service feeders
2. Allowed MC cable in selected locations with home runs in conduit

Specifications:

1. Tap fees, by Owner.
2. Clarified slatted wood panel type in specifications/drawings.
3. Clarified location of closed cell and open cell spray foam insulation.

THIS DOCUMENT IS A BRIEF SUMMARY OF CHANGES TO DRAWINGS/SPECIFICATIONS AND DOES NOT RELIEVE BIDDER FROM MISSED SCOPE OR MATERIAL IN PREPARATION OF BID. BIDDERS MUST REVIEW THE CONTRACT DOCUMENTS IN THEIR ENTIRETY.

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SECTION 000300 - BID PROPOSAL FORM

Bidder _____

Address _____

Telephone _____ FAX _____

To: Tri-County Board of Recovery and
Mental Health
1100 Wayne Street, Suite 4000
Troy, OH 45373

Project: New Administration & Training Building
1280 N. County Rd. 25A
Troy, OH 45373

I have received and carefully reviewed the Contract Documents prepared by:

Freytag & Associates, Inc.
226 North Miami Avenue
P.O. Box 220
Sidney, Ohio 45365

Having carefully reviewed the Instructions to Bidders, Drawings, Specifications and other Contract Documents for the Project titled New Administration & Training Building including having also received, read, and taken into account the following Addenda:

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

and likewise, having inspected the existing site, and the conditions affecting and governing the Project, the undersigned hereby proposes to furnish all materials and to perform all labor, as specified and described in the said Specifications and/or as shown on the said Drawings for all Work necessary to complete the Project on a timely basis and in accordance with the Contract Documents regardless of whether expressly provided for in such Specifications and Drawings.

Before completing the Bid Form, the undersigned represents that it has carefully reviewed the Legal Notice, Instructions to Bidders, this Bid Form, Form of Bid Guaranty and Contract Bond, Contractor's Affidavit (O.R.C. 5719.042), Owner-Contractor Agreement, General Conditions of the Contract (as modified for the Project), Drawings, Project Specifications, and other Contract Documents. Failure to comply with provisions of the Contract Documents may be cause for disqualification of the bid.

BONDS AND CONTRACT: If the undersigned is notified of bid acceptance, it agrees to furnish required bonds as indicated in the Instructions to Bidders.

COMPLETION OF WORK: In submitting a bid, the undersigned agrees to execute the Owner- Contractor Agreement in the form included in the Contract Documents and to complete its Work as required by the Contract Documents.

The wording of the Bid Form shall be used throughout, without change, alteration, or addition.

Any change may cause it to be rejected.

Bidder is cautioned to bid only on the Brands or Standards specified.

If there is an inconsistency or conflict in the Bid amount, the lowest amount shall control, whether expressed in numbers or words

BID:

Include the cost of all labor, material, all other expenses, and profit for the contract listed below. Bidder is to fill in all blanks related to the Bid Package for which a bid is being submitted. If no bid is submitted for an item, leave the item blank or insert "NO BID" in the blank. For alternate items, indicate whether the amount stated is in addition to or a deduction from the base bid amount (if there is no indication whether the amount for an alternate is an addition or a deduction, the amount shall be a deduction.

In submitting this Proposal, I agree to the to hold my bid(s) open for 60 days after receipt of bids.

BASE BID: I agree to execute all Work including Allowances indicated for the lump sum amount stated therein. For descriptions of Base Bid Work, refer to Section 011000 – SUMMARY OF WORK.

ITEM 1, BASE BID – SINGLE PRIME CONTRACT FOR ALL WORK.

ALL LABOR AND MATERIALS, for the SUM of \$ _____

SUM in words _____

Prevailing Wage Rates Apply

SUBCONTRACTOR: I agree to list my proposed Subcontractor for the following areas of the Work.

ITEM 1a Plumbing

Name of Subcontractor included in Base Bid _____

ITEM 1b HVAC

Name of Subcontractor included in Base Bid _____

ITEM 1c Electrical

Name of Subcontractor included in Base Bid _____

ITEM 1d Fire Protection

Name of Subcontractor included in Base Bid _____

ALTERNATES: I agree to state the cost for the following work indicated. For descriptions of Alternate Work, refer to Section 012300 - Alternates.

Alt. 1: 12 Month Extended Turf and Grass Maintenance, if Alternate 1 is accepted ADD the sum to Base Bid, Item 1 as follows:

ALL LABOR AND MATERIALS, for the SUM of \$ _____

Sum in words _____

TIME OF COMPLETION

Each Bidder shall state the estimated number of calendar days required for the completion of the project following authorization by the Owner to proceed with the Work.

_____ Estimated Calendar Days

BIDDER CERTIFICATIONS. The Bidder hereby acknowledges that the following representations in this bid are material and not mere recitals:

1. The Bidder acknowledges that this is a public project involving public funds, and that the Owner expects and requires that each successful Bidder adhere to the highest ethical and performance standards. The Bidder by submitting its bid pledges and agrees that (a) it will act at all times with absolute integrity and truthfulness in its dealings with the Owner and the Design Professional, (b) it will use its best efforts to cooperate with the Owner and the Design Professional and all other Contractors on the Project and at all times will act with professionalism and dignity in its dealings with the Owner, Design Professional and other Contractors, (c) it will assign only competent supervisors and workers to the Project, each of whom is fully qualified to perform the tasks that are assigned to him/her, and (d) it has read, understands and will comply with the terms of the Contract Documents.
2. The Bidder represents that it has had a competent person carefully and diligently review each part of the Contract Documents, including any Divisions of the Specifications and parts of the Drawings that are not directly applicable to the Work on which the Bidder is submitting its bid. By submitting its bid, each Bidder represents and agrees, based upon its careful and diligent review of the Contract Documents, that it is not aware of any conflicts, inconsistencies, errors or omissions in the Contract Documents for which it has not notified the Design Professional in writing at least ten (10) days prior to the bid opening. If there are any such conflicts, inconsistencies, errors or omissions in the Contract Documents, the Bidder (i) will provide the labor, equipment or materials of the better quality or greater quantity of Work; and/or (ii) will comply with the more stringent requirements. The Bidder will not be entitled to any additional compensation for any conflicts, inconsistencies, errors or omissions that would have been discovered by such careful and diligent review, unless it has given such prior written notice to Design Professional.
3. The Bidder represents that it has had a competent person carefully and diligently inspect and examine the entire site for the Project, the existing buildings, and the surrounding area, including all parts of the site applicable to the Work for which it is submitting its bid, and carefully correlate the results of the inspection with the requirements of the Contract Documents. The Bidder agrees that its bid shall include all costs attributable to site and surrounding area conditions that would have been discovered by such careful and diligent inspection and examination of the site and the surrounding area, and the Bidder shall not be entitled to any Change Order, additional compensation, or additional time on account of conditions that could have been discovered by such an investigation.
4. The Bidder represents that the bid contains the name of every person interested therein and is based upon the Standards specified by the Contract Documents.

5. The Bidder represents, understands and agrees that a) the Claim procedures in the General Conditions as modified for the Project are material terms of the Contract Documents, b) if it has a Claim, it will have its personnel provide complete and accurate information to complete and submit the Statement of Claim form on a timely basis, c) the proper completion and timely submission of a Statement of Claim form is a condition precedent to any change in the Contract Sum or the Contract Time(s), and d) the proper and timely submission of the Statement of Claim form provides the Owner and the Design Professional with necessary information so that the Owner may investigate the Claim and mitigate its damages.
6. The Bidder and each person signing on behalf of the Bidder certifies that to the best of the undersigned's knowledge and belief: (a) the Base Bid and any Alternate bid in the bid have been arrived at independently without collusion, consultation, communication or agreement, or for the purpose of restricting competition as to any matter relating to such Base Bid or Alternate bid with any other Bidder; (b) unless otherwise required by law, the Base Bid, and any Alternate bid in the bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to the bid opening, directly or indirectly, to any other Bidder who would have any interest in the Base Bid or Alternate bid; (c) no attempt has been made or will be made by the Bidder to induce any other Person to submit or not to submit a bid for the purpose of restricting competition; and (d) the statements made in this Bid Form are true and correct.
7. The Bidder will execute the form of Owner/Contractor Agreement in the form included with the Contract Documents, if a Contract is awarded on the basis of this bid, and if the Bidder does not execute the Contract Form for any reason, other than as authorized by law, the Bidder and the Bidder's Surety are liable to the Owner.
8. The Bidder certifies that the upon the award of a Contract, the Contractor will ensure that all of the Contractor's employees, while working on the Project site, will not purchase, transfer, use or possess illegal drugs or alcohol or abuse prescription drugs in any way.
9. The Bidder agrees to furnish any information requested by the Design Professional or the Owner's authorized representative to evaluate that the Bidder has submitted the lowest responsible bid and that the bid is responsive to the specifications.
10. The Bidder certifies that it has no unresolved findings for recovery issued by the Auditor of State.
11. The Bidder further states that it is a duly licensed contractor, for the type of work proposed, in accordance with the **Miami County** local requirements, and that all fees, permits, etc., pursuant to submitting this Bid have been paid in full.

LEGAL NAME OF BIDDER: _____

BIDDER IS (check one): sole proprietor ___ partnership ___ corporation ___ other legal entity ___.

NAME & TITLE OF PERSON LEGALLY AUTHORIZED TO BIND BIDDER TO A CONTRACT:

| | |
|------|-------|
| Name | Title |
|------|-------|

DATE SIGNED: _____

SIGNATURE: _____

ADDRESS: _____

TELEPHONE: _____

FEDERAL TAX I.D. # _____

This Bid Shall be Furnished in Duplicate, With Both Copies Enclosed in the Sealed Bid Envelope

SECTION 000411 - BID GUARANTEE AND CONTRACT BOND

(Section 153.571 Ohio Revised Code)

KNOW ALL MEN/WOMEN BY THESE PRESENT, that we, the undersigned _____

(Name and Address)

as Principal and _____

_____ as Surety,

are hereby held and firmly bound unto the _____ as Obligee

in the penal sum of the dollar amount of the bid submitted by the Principal to the Obligee on _____

_____ to undertake the project known as: _____

The penal sum referred to herein shall be the dollar amount of the principal's bid to the Obligee, incorporating any additive or deductive alternate proposals made by the principal on the date referred to above to the obligee, which are accepted by the Obligee. In no case shall the penal sum exceed the amount of _____ dollars (\$_____).

(If the above line is left blank, the penal sum will be the full amount of the principal's bid, including alternates. Alternatively, if completed, the amount stated must not be less than the full amount of the bid, including alternates, in dollars and cents. A percentage is not acceptable.) For the payment of the penal sum well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that the above named principal has submitted a bid on the above referred to project;

NOW, THEREFORE, if the obligee accepts the bid of the principal and the principal fails to enter into a proper contract in accordance with the bid, plans, details, specifications, and bills of material; and in the event the principal pays to the obligee the difference not to exceed ten percent of the penalty hereof between the amount specified in the bid and such larger amount for which the obligee may in good faith contract with the next lowest bidder to perform the work covered by the bid; or in the event the obligee does not award the contract to the next lowest bidder and resubmits the project for bidding, the principal will pay the obligee the difference not to exceed ten percent of the penalty hereof between the amount specified in the bid, or the costs, in connection with the resubmission, of printing new contract documents, required advertising and printing and mailing notices to prospective bidders, whichever is less, then this obligation shall be null and void, otherwise to remain in full force and effect. If the obligee accepts the bid of the principal, and the principal within ten days after awarding the contract, enters into a proper contract in accordance with the bid, plans, details, specifications, and bills of material, which said contract is made a part of this bond the same as though set forth herein; and

IF THE SAID principal shall well and faithfully perform each and every condition of such contract; and indemnify the obligee against all damage suffered by failure to perform such contract according to the provisions thereof and in accordance with the plans, details, specifications, and bills of material therefore; and shall pay all lawful claims of subcontractors, material suppliers and laborers, for labor performed and materials furnished in the carrying forward, performing, or completing benefit of any material supplier or laborer having a just claim, as well as for the obligee herein; then this obligation shall be void; otherwise the same shall remain in full 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 SAID Surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of said contract of in or to the plans and specifications therefore shall in any way affect the obligations of said Surety on its bond, and it does hereby waive notice of any such modifications, omissions or additions to the terms of the contract or to the work or to the specifications.

SIGNED AND SEALED This _____ day of _____, _____.

PRINCIPAL: _____

BY: _____

TITLE: _____

SURETY: _____

BY: _____
Attorney-In-Fact

SURETY COMPANY ADDRESS:

Street

City State Zip

Telephone

SURETY AGENT'S ADDRESS:

Agency Name

Street

City State Zip

Telephone

NOTE: Failure by any party to sign Bid Guaranty and Contract Bond shall result in rejection of bid.

SECTION 000480 - NONCOLLUSION AFFIDAVIT

No bid will be accepted that does not have this form completely executed.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

- (a) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or any competitor;
- (b) Unless otherwise required by law, the prices, which have been quoted in this bid, have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor;
- (c) No attempt has been made or will be made by the bidder to insure any other person, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition;
- (d) The person signing this bid or proposal certifies that he/she has been fully informed regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing in its behalf.
- (e) That attached hereto (if corporate bidder) is a certified copy of resolution authorizing the execution of this certificate by the signature of this bid or proposal in behalf of the corporation bidder.

(Individual)

(Partnership)

(Corporation)

Date: _____

By _____

Subscribed and sworn to before me this

_____ day of _____, _____

_____, My commission expires _____, _____

This Noncollusion Affidavit must be submitted with the Bid.

(This page intentionally left blank)

SECTION 000481 - TAX COMPLIANCE AFFIDAVIT

(for County of Project)

State of **Ohio**

County of _____,

_____ Being first duly sworn, deposes and says that he/she is
(Name)

the _____ of _____ with offices
(Title) (Name of Contractor)

located at _____, and its duly authorized
(Address of Contractor)

Representative, states that effective the _____ day of _____, _____,
(Date of bid submission).

(Name of Contractor)

() is charged with delinquent personal property taxes on the general list of personal property in _____ County, **Ohio** or any other counties containing property under the jurisdiction of the Auditor of _____ County, **Ohio**.

() is not charged with delinquent personal property taxes on the general list of personal property in _____ County, **Ohio** or any other counties containing property under the jurisdiction of the Auditor of _____ County, **Ohio**.

| County | Amount (Include total amount penalties and interest thereon) |
|--------|---|
| _____ | \$ _____ |
| _____ | \$ _____ |
| _____ | \$ _____ |

(Affiant)

Sworn to and subscribed this _____ day of _____, _____.

(Notary Public)

My Commission expires

_____, _____.

[Section 5719.042 Ohio Revised Code](#)

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SECTION 006000 - PROJECT FORMS

1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS

- A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:
1. AIA Document A104-2017 "Standard Abbreviated Form of Agreement between Owner and Contractor."
 - a. The above document is hereby made a part of these contract documents. Copies of this standard document is available from:
 - 1) The American Institute of Architects, <https://www.aiacontractdocs.org>; (800) 942-7732.
 - 2) AIA Dayton, 5816 Daffodil Circle, P.O. Box 719, Dayton, Ohio 45449.
 - b. The above document is available for inspection at:
 - 1) Freytag & Associates, Inc., Architects/Engineers, 226 N. Miami Ave., Sidney, Ohio 45365
 - c. A Sample Document follows this Section.
 2. The General Conditions are included in and part of AIA Document A105-2017 "Standard Short Form of Agreement between Owner and Contractor."

1.2 ADMINISTRATIVE FORMS

- A. Administrative Forms: Additional administrative forms are specified in Division 01 General Requirements.
- B. Copies of AIA standard forms may be obtained from the American Institute of Architects; <https://www.aiacontractdocs.org>; (800) 942-7732.
- C. Preconstruction Forms:
1. Form of Performance Bond and Labor and Material Bond: AIA Document A312-2010 "Performance Bond and Payment Bond."
 2. Form of Certificate of Insurance: AIA Document G715-1991 "Supplemental Attachment, ACORD Certificate of Insurance."
- D. Information and Modification Forms:
1. Form for Requests for Information (RFIs): AIA Document G716-2004 "Request for Information (RFI)."
 2. Form of Request for Proposal: AIA Document G709-2018 "Work Changes Proposal Request."
 3. Change Order Form: AIA Document G701-2017 "Change Order."
 4. Form of Architect's Memorandum for Minor Changes in the Work: AIA Document G710-2017 "Architect's Supplemental Instructions."
 5. Form of Change Directive: AIA Document G714-2017 "Construction Change Directive."

E. Payment Forms:

1. Schedule of Values Form: AIA Document G703-1992 "Continuation Sheet."
2. Payment Application: AIA Document G702-1992/703-1992 "Application and Certificate for Payment and Continuation Sheet."
3. Form of Contractor's Affidavit: AIA Document G706-1994 "Contractor's Affidavit of Payment of Debts and Claims."
4. Form of Affidavit of Release of Liens: AIA Document G706A-1994 "Contractor's Affidavit of Payment of Release of Liens."
5. Form of Consent of Surety: AIA Document G707-1994 "Consent of Surety to Final Payment."

1.3 SAMPLE DOCUMENT

AIA Document A104-2017 "SAMPLE Standard Abbreviated Form of Agreement between Owner and Contractor" follows.

END OF DOCUMENT 006000



AIA[®] Document A104[™] – 2017

Standard Abbreviated Form of Agreement Between Owner and Contractor

AGREEMENT made as of the _____ day of _____ in the year _____
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

The Architect:
(Name, legal status, address and other information)

Sample

The Owner and Contractor agree as follows.

TABLE OF ARTICLES

| | |
|----|--|
| 1 | THE WORK OF THIS CONTRACT |
| 2 | DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION |
| 3 | CONTRACT SUM |
| 4 | PAYMENT |
| 5 | DISPUTE RESOLUTION |
| 6 | ENUMERATION OF CONTRACT DOCUMENTS |
| 7 | GENERAL PROVISIONS |
| 8 | OWNER |
| 9 | CONTRACTOR |
| 10 | ARCHITECT |
| 11 | SUBCONTRACTORS |
| 12 | CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS |
| 13 | CHANGES IN THE WORK |
| 14 | TIME |
| 15 | PAYMENTS AND COMPLETION |
| 16 | PROTECTION OF PERSONS AND PROPERTY |
| 17 | INSURANCE & BONDS |
| 18 | CORRECTION OF WORK |
| 19 | MISCELLANEOUS PROVISIONS |
| 20 | TERMINATION OF THE CONTRACT |
| 21 | CLAIMS AND DISPUTES |

EXHIBIT A DETERMINATION OF THE COST OF THE WORK

ARTICLE 1 THE WORK OF THIS CONTRACT

The Contractor shall execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 2.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

- The date of this Agreement.
- A date set forth in a notice to proceed issued by the Owner.

- Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 2.2 The Contract Time shall be measured from the date of commencement.

§ 2.3 Substantial Completion

§ 2.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check the appropriate box and complete the necessary information.)

- Not later than () calendar days from the date of commencement of the Work.
- By the following date:

§ 2.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work

Substantial Completion Date

§ 2.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 2.3, liquidated damages, if any, shall be assessed as set forth in Section 3.5.

ARTICLE 3 CONTRACT SUM

§ 3.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:

(Check the appropriate box.)

- Stipulated Sum, in accordance with Section 3.2 below
- Cost of the Work plus the Contractor's Fee, in accordance with Section 3.3 below
- Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 3.4 below

(Based on the selection above, complete Section 3.2, 3.3 or 3.4 below.)

§ 3.2 The Stipulated Sum shall be (\$), subject to additions and deductions as provided in the Contract Documents.

§ 3.2.1 The Stipulated Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 3.2.2 Unit prices, if any:

(Identify the item and state the unit price and the quantity limitations, if any, to which the unit price will be applicable.)

| Item | Units and Limitations | Price per Unit (\$0.00) |
|------|-----------------------|-------------------------|
|------|-----------------------|-------------------------|

§ 3.2.3 Allowances, if any, included in the stipulated sum:

(Identify each allowance.)

| Item | Price |
|------|-------|
|------|-------|

§ 3.3 Cost of the Work Plus Contractor's Fee

§ 3.3.1 The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.

§ 3.3.2 The Contractor's Fee:

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)

§ 3.4 Cost of the Work Plus Contractor's Fee With a Guaranteed Maximum Price

§ 3.4.1 The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.

§ 3.4.2 The Contractor's Fee:

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)

§ 3.4.3 Guaranteed Maximum Price

§ 3.4.3.1 The sum of the Cost of the Work and the Contractor's Fee is guaranteed by the Contractor not to exceed (\$), subject to additions and deductions by changes in the Work as provided in the Contract Documents. This maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.

(Insert specific provisions if the Contractor is to participate in any savings.)

§ 3.4.3.2 The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 3.4.3.3 Unit Prices, if any:

(Identify the item and state the unit price and the quantity limitations, if any, to which the unit price will be applicable.)

| Item | Units and Limitations | Price per Unit (\$0.00) |
|------|-----------------------|-------------------------|
|------|-----------------------|-------------------------|

§ 3.4.3.4 Allowances, if any, included in the Guaranteed Maximum Price:

(Identify each allowance.)

| Item | Price |
|------|-------|
|------|-------|

§ 3.4.3.5 Assumptions, if any, on which the Guaranteed Maximum Price is based:

§ 3.4.3.6 To the extent that the Contract Documents are anticipated to require further development, the Guaranteed Maximum Price includes the costs attributable to such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include changes in scope, systems, kinds and quality of materials, finishes or equipment, all of which, if required, shall be incorporated by Change Order.

§ 3.4.3.7 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in Section 3.4.3.5. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the agreed-upon assumptions contained in Section 3.4.3.5 and the revised Contract Documents.

§ 3.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

ARTICLE 4 PAYMENT

§ 4.1 Progress Payments

§ 4.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 4.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 4.1.3 Provided that an Application for Payment is received by the Architect not later than the _____ day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the _____ day of the _____ month. If an Application for Payment is received by the Architect after the date fixed above, payment shall be made by the Owner not later than _____ () days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 4.1.4 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold retainage from the payment otherwise due as follows:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment and any terms for reduction of retainage during the course of the Work. The amount of retainage may be limited by governing law.)

§ 4.1.5 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

%

§ 4.2 Final Payment

§ 4.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 18.2, and to satisfy other requirements, if any, which extend beyond final payment;
- .2 the Contractor has submitted a final accounting for the Cost of the Work, where payment is on the basis of the Cost of the Work with or without a Guaranteed Maximum Price; and
- .3 a final Certificate for Payment has been issued by the Architect in accordance with Section 15.7.1.

§ 4.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

ARTICLE 5 DISPUTE RESOLUTION

§ 5.1 Binding Dispute Resolution

For any claim subject to, but not resolved by, mediation pursuant to Section 21.5, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

- Arbitration pursuant to Section 21.6 of this Agreement
- Litigation in a court of competent jurisdiction

Other (Specify)

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, claims will be resolved in a court of competent jurisdiction.

ARTICLE 6 ENUMERATION OF CONTRACT DOCUMENTS

§ 6.1 The Contract Documents are defined in Article 7 and, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 6.1.1 The Agreement is this executed AIA Document A104™–2017, Standard Abbreviated Form of Agreement Between Owner and Contractor.

§ 6.1.2 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

(Insert the date of the E203–2013 incorporated into this Agreement.)

§ 6.1.3 The Supplementary and other Conditions of the Contract:

| Document | Title | Date | Pages |
|----------|-------|------|-------|
|----------|-------|------|-------|

§ 6.1.4 The Specifications:

(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

| Section | Title | Date | Pages |
|---------|-------|------|-------|
|---------|-------|------|-------|

§ 6.1.5 The Drawings:

(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

| Number | Title | Date |
|--------|-------|------|
|--------|-------|------|

§ 6.1.6 The Addenda, if any:

| Number | Date | Pages |
|--------|------|-------|
|--------|------|-------|

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are enumerated in this Article 6.

§ 6.1.7 Additional documents, if any, forming part of the Contract Documents:

.1 Other Exhibits:
(Check all boxes that apply.)

- Exhibit A, Determination of the Cost of the Work.
- AIA Document E204™-2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)
- The Sustainability Plan:

| Title | Date | Pages |
|-------|------|-------|
|-------|------|-------|

Supplementary and other Conditions of the Contract:

| Document | Title | Date | Pages |
|----------|-------|------|-------|
|----------|-------|------|-------|

.2 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents.)

ARTICLE 7 GENERAL PROVISIONS

§ 7.1 The Contract Documents

The Contract Documents are enumerated in Article 6 and consist of this Agreement (including, if applicable, Supplementary and other Conditions of the Contract), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 7.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between any persons or entities other than the Owner and the Contractor.

§ 7.3 The Work

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

§ 7.4 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 7.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service

§ 7.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 7.5.2 The Contractor, Subcontractors, Sub-subcontractors and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to the protocols established pursuant to Sections 7.6 and 7.7, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 7.6 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 7.7 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

§ 7.8 Severability

The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 7.9 Notice

§ 7.9.1 Except as otherwise provided in Section 7.9.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering Notice in electronic format such as name, title and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 7.9.2 Notice of Claims shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 7.10 Relationship of the Parties

Where the Contract is based on the Cost of the Work plus the Contractor's Fee, with or without a Guaranteed Maximum Price, the Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.

ARTICLE 8 OWNER

§ 8.1 Information and Services Required of the Owner

§ 8.1.1 Prior to commencement of the Work, at the written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 8.1.1, the Contract Time shall be extended appropriately.

§ 8.1.2 The Owner shall furnish all necessary surveys and a legal description of the site.

§ 8.1.3 The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 8.1.4 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 9.6.1, the Owner shall secure and pay for other necessary approvals, easements, assessments, and charges required for the construction, use, or occupancy of permanent structures or for permanent changes in existing facilities.

§ 8.2 Owner's Right to Stop the Work

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents, or repeatedly fails to carry out the Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order is eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

§ 8.3 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to any other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 15.4.3, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including the Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 21.

ARTICLE 9 CONTRACTOR

§ 9.1 Review of Contract Documents and Field Conditions by Contractor

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

§ 9.1.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 8.1.2, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies, or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.

§ 9.1.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 9.2 Supervision and Construction Procedures

§ 9.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters.

§ 9.2.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

§ 9.3 Labor and Materials

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

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

§ 9.3.3 The Contractor may make a substitution only with the consent of the Owner, after evaluation by the Architect and in accordance with a Modification.

§ 9.4 Warranty

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants

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that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation or normal wear and tear under normal usage. All other warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 15.6.3.

§ 9.5 Taxes

The Contractor shall pay sales, consumer, use, and other similar taxes that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 9.6 Permits, Fees, Notices, and Compliance with Laws

§ 9.6.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 9.6.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 9.7 Allowances

The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. The Owner shall select materials and equipment under allowances with reasonable promptness. Allowance amounts shall include the costs to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts. Contractor's costs for unloading and handling at the site, labor, installation, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowance.

§ 9.8 Contractor's Construction Schedules

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

§ 9.8.2 The Contractor shall perform the Work in general accordance with the most recent schedule submitted to the Owner and Architect.

§ 9.9 Submittals

§ 9.9.1 The Contractor shall review for compliance with the Contract Documents and submit to the Architect Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents in coordination with the Contractor's construction schedule and in such sequence as to allow the Architect reasonable time for review. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them; (2) determined and verified materials, field measurements, and field construction criteria related thereto, or will do so; and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Work shall be in accordance with approved submittals.

§ 9.9.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents.

§ 9.9.3 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents or unless the Contractor needs to provide such services in order to carry out the Contractor's own responsibilities. If professional design services or certifications by a design professional are specifically required, the Owner and the Architect will specify the performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional. If no criteria are specified, the design

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shall comply with applicable codes and ordinances. Each Party shall be entitled to rely upon the information provided by the other Party. The Architect will review and approve or take other appropriate action on submittals for the limited purpose of checking for conformance with information provided and the design concept expressed in the Contract Documents. The Architect's review of Shop Drawings, Product Data, Samples, and similar submittals shall be for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. In performing such review, the Architect will approve, or take other appropriate action upon, the Contractor's Shop Drawings, Product Data, Samples, and similar submittals.

§ 9.10 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 9.11 Cutting and Patching

The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

§ 9.12 Cleaning Up

The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus material from and about the Project.

§ 9.13 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 9.14 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 9.15 Indemnification

§ 9.15.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 9.15.1.

§ 9.15.2 In claims against any person or entity indemnified under this Section 9.15 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 9.15.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 10 ARCHITECT

§ 10.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction, until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

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

§ 10.3 The Architect will visit the site at intervals appropriate to the stage of the construction to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general, if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 10.4 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

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

§ 10.6 The Architect has authority to reject Work that does not conform to the Contract Documents and to require inspection or testing of the Work.

§ 10.7 The Architect will review and approve or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 10.8 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect will make initial decisions on all claims, disputes, and other matters in question between the Owner and Contractor but will not be liable for results of any interpretations or decisions rendered in good faith.

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

ARTICLE 11 SUBCONTRACTORS

§ 11.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site.

§ 11.2 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the Subcontractors or suppliers proposed for each of the principal portions of the Work. The Contractor shall not contract with any Subcontractor or supplier to whom the Owner or Architect has made reasonable written objection within ten days after receipt of the Contractor's list of Subcontractors and suppliers. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 11.3 Contracts between the Contractor and Subcontractors shall (1) require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by the Contract Documents, assumes toward the Owner and Architect, and (2) allow the Subcontractor the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Owner.

ARTICLE 12 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 12.1 The term “Separate Contractor(s)” shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner’s own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 12.2 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor’s activities with theirs as required by the Contract Documents.

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

ARTICLE 13 CHANGES IN THE WORK

§ 13.1 By appropriate Modification, changes in the Work may be accomplished after execution of the Contract. The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, with the Contract Sum and Contract Time being adjusted accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Owner, Contractor, and Architect, or by written Construction Change Directive signed by the Owner and Architect. Upon issuance of the Change Order or Construction Change Directive, the Contractor shall proceed promptly with such changes in the Work, unless otherwise provided in the Change Order or Construction Change Directive.

§ 13.2 Adjustments in the Contract Sum and Contract Time resulting from a change in the Work shall be determined by mutual agreement of the parties or, in the case of a Construction Change Directive signed only by the Owner and Architect, by the Contractor’s cost of labor, material, equipment, and reasonable overhead and profit, unless the parties agree on another method for determining the cost or credit. Pending final determination of the total cost of a Construction Change Directive, the Contractor may request payment for Work completed pursuant to the Construction Change Directive. The Architect will make an interim determination of the amount of payment due for purposes of certifying the Contractor’s monthly Application for Payment. When the Owner and Contractor agree on adjustments to the Contract Sum and Contract Time arising from a Construction Change Directive, the Architect will prepare a Change Order.

§ 13.3 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work.

§ 13.4 If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be equitably adjusted as mutually agreed between the Owner and Contractor; provided that the Contractor provides notice to the Owner and Architect promptly and before conditions are disturbed.

ARTICLE 14 TIME

§ 14.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing this Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 14.2 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 14.3 The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 14.4 The date of Substantial Completion is the date certified by the Architect in accordance with Section 15.6.3.

§ 14.5 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) changes ordered in the Work; (2) by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions not reasonably

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anticipatable, unavoidable casualties, or any causes beyond the Contractor's control; or (3) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine, subject to the provisions of Article 21.

ARTICLE 15 PAYMENTS AND COMPLETION

§ 15.1 Schedule of Values

§ 15.1.1 Where the Contract is based on a Stipulated Sum or the Cost of the Work with a Guaranteed Maximum Price pursuant to Section 3.2 or 3.4, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Stipulated Sum or Guaranteed Maximum Price to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy required by the Architect. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 15.1.2 The allocation of the Stipulated Sum or Guaranteed Maximum Price under this Section 15.1 shall not constitute a separate stipulated sum or guaranteed maximum price for each individual line item in the schedule of values.

§ 15.2 Control Estimate

§ 15.2.1 Where the Contract Sum is the Cost of the Work, plus the Contractor's Fee without a Guaranteed Maximum Price pursuant to Section 3.3, the Contractor shall prepare and submit to the Owner a Control Estimate within 14 days of executing this Agreement. The Control Estimate shall include the estimated Cost of the Work plus the Contractor's Fee.

§ 15.2.2 The Control Estimate shall include:

- .1 the documents enumerated in Article 6, including all Modifications thereto;
- .2 a list of the assumptions made by the Contractor in the preparation of the Control Estimate to supplement the information provided by the Owner and contained in the Contract Documents;
- .3 a statement of the estimated Cost of the Work organized by trade categories or systems and the Contractor's Fee;
- .4 a project schedule upon which the Control Estimate is based, indicating proposed Subcontractors, activity sequences and durations, milestone dates for receipt and approval of pertinent information, schedule of shop drawings and samples, procurement and delivery of materials or equipment the Owner's occupancy requirements, and the date of Substantial Completion; and
- .5 a list of any contingency amounts included in the Control Estimate for further development of design and construction.

§ 15.2.3 When the Control Estimate is acceptable to the Owner and Architect, the Owner shall acknowledge it in writing. The Owner's acceptance of the Control Estimate does not imply that the Control Estimate constitutes a Guaranteed Maximum Price.

§ 15.2.4 The Contractor shall develop and implement a detailed system of cost control that will provide the Owner and Architect with timely information as to the anticipated total Cost of the Work. The cost control system shall compare the Control Estimate with the actual cost for activities in progress and estimates for uncompleted tasks and proposed changes. This information shall be reported to the Owner, in writing, no later than the Contractor's first Application for Payment and shall be revised and submitted with each Application for Payment.

§ 15.2.5 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in the Control Estimate. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the Control Estimate and the revised Contract Documents.

§ 15.3 Applications for Payment

§ 15.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 15.1, for completed portions of the Work. The application shall be notarized, if required; be supported by all data substantiating the Contractor's right to payment that the Owner or Architect require; shall reflect retainage if provided for in the Contract Documents; and include any revised cost control information required by Section 15.2.4. Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 15.3.2 With each Application for Payment where the Contract Sum is based upon the Cost of the Work, or the Cost of the Work with a Guaranteed Maximum Price, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor plus payrolls for the period covered by the present Application for Payment, less that portion of the progress payments attributable to the Contractor's Fee.

§ 15.3.3 Payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment stored, and protected from damage, off the site at a location agreed upon in writing.

§ 15.3.4 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or other encumbrances adverse to the Owner's interests.

§ 15.4 Certificates for Payment

§ 15.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner of the Architect's reasons for withholding certification in whole or in part as provided in Section 15.4.3.

§ 15.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluations of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 15.4.3 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 15.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 15.4.1. If the Contractor and the Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 9.2.2, because of

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

§ 15.4.4 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 15.4.3, in whole or in part, that party may submit a Claim in accordance with Article 21.

§ 15.5 Progress Payments

§ 15.5.1 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to sub-subcontractors in a similar manner.

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

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

§ 15.5.4 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 15.6 Substantial Completion

§ 15.6.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

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

§ 15.6.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. When the Architect determines that the Work or designated portion thereof is substantially complete, the Architect will issue a Certificate of Substantial Completion which shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 15.6.4 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 15.7 Final Completion and Final Payment

§ 15.7.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions stated in Section 15.7.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 15.7.2 Final payment shall not become due until the Contractor has delivered to the Owner a complete release of all liens arising out of this Contract or receipts in full covering all labor, materials and equipment for which a lien could be filed, or a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including costs and reasonable attorneys' fees.

§ 15.7.3 The making of final payment shall constitute a waiver of claims by the Owner except those arising from

- .1 liens, claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

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

ARTICLE 16 PROTECTION OF PERSONS AND PROPERTY

§ 16.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation, or replacement in the course of construction.

The Contractor shall comply with, and give notices required by, applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons and property and their protection from damage, injury, or loss. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, a Subcontractor, a sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 16.1.2 and 16.1.3. The Contractor may make a claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 9.15.

§ 16.2 Hazardous Materials and Substances

§ 16.2.1 The Contractor is responsible for compliance with the requirements of the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 16.2.2 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area, if in fact, the material or substance presents the risk of bodily injury or death as described in Section 16.2.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 16.2.3 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

ARTICLE 17 INSURANCE AND BONDS

§ 17.1 Contractor's Insurance

§ 17.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in this Section 17.1 or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the insurance required by this Agreement from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 18.4, unless a different duration is stated below:

§ 17.1.2 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than (\$) each occurrence, (\$) general aggregate, and (\$) aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 9.15.

§ 17.1.3 Automobile Liability covering vehicles owned by the Contractor and non-owned vehicles used by the Contractor, with policy limits of not less than (\$) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance, and use of those motor vehicles along with any other statutorily required automobile coverage.

§ 17.1.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as those required under Section 17.1.2 and 17.1.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ 17.1.5 Workers' Compensation at statutory limits.

§ 17.1.6 Employers' Liability with policy limits not less than (\$) each accident (\$) each employee, and (\$) policy limit.

§ 17.1.7 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ 17.1.8 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ 17.1.9 Coverage under Sections 17.1.7 and 17.1.8 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ 17.1.10 The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Section 17.1 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the period required by Section 17.1.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy.

§ 17.1.11 The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ 17.1.12 To the fullest extent permitted by law, the Contractor shall cause the commercial liability coverage required by this Section 17.1 to include (1) the Owner, the Architect, and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's Consultants, CG 20 32 07 04.

§ 17.1.13 Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by this Section 17.1, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 17.1.14 Other Insurance Provided by the Contractor

(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage

Limits

§ 17.2 Owner's Insurance

§ 17.2.1 Owner's Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 17.2.2 Property Insurance

§ 17.2.2.1 The Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed or materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section 17.2.2.2, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ 17.2.2.2 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section 17.2.2.1 or, if necessary, replace the insurance policy required under Section 17.2.2.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 18.4.

§ 17.2.2.3 If the insurance required by this Section 17.2.2 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ 17.2.2.4 If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 18.4, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ 17.2.2.5 Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Section 17.2.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by this Section 17.2.2. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ 17.2.2.6 Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any insurance required by this Section 17.2.2, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 17.2.2.7 Waiver of Subrogation

§ 17.2.2.7.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by this Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 17.2.2.7 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 17.2.2.7.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 17.2.2.7.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

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

§ 17.2.3 Other Insurance Provided by the Owner

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage

Limits

§ 17.3 Performance Bond and Payment Bond

§ 17.3.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in the Contract Documents on the date of execution of the Contract.

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

ARTICLE 18 CORRECTION OF WORK

§ 18.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed, or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense, unless compensable under Section A.1.7.3 in Exhibit A, Determination of the Cost of the Work.

§ 18.2 In addition to the Contractor's obligations under Section 9.4, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 15.6.3, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty.

§ 18.3 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 8.3.

§ 18.4 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 18.5 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Article 18.

ARTICLE 19 MISCELLANEOUS PROVISIONS

§ 19.1 Assignment of Contract

Neither party to the Contract shall assign the Contract without written consent of the other, except that the Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 19.2 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 21.6.

§ 19.3 Tests and Inspections

Tests, inspections, and approvals of portions of the Work required by the Contract Documents or by applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 19.4 The Owner's representative:

(Name, address, email address and other information)

§ 19.5 The Contractor's representative:
(Name, address, email address and other information)

§ 19.6 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

ARTICLE 20 TERMINATION OF THE CONTRACT

§ 20.1 Termination by the Contractor

If the Architect fails to certify payment as provided in Section 15.4.1 for a period of 30 days through no fault of the Contractor, or if the Owner fails to make payment as provided in Section 4.1.3 for a period of 30 days, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 20.2 Termination by the Owner for Cause

§ 20.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 20.2.2 When any of the reasons described in Section 20.2.1 exists, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any other remedy the Owner may have and after giving the Contractor seven days' notice, terminate the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 20.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 20.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

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

§ 20.3 Termination by the Owner for Convenience

The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. The Owner shall pay the Contractor for Work executed; and costs incurred by reason of such termination, including costs attributable to termination of Subcontracts; and a termination fee, if any, as follows:

(Insert the amount of or method for determining the fee payable to the Contractor by the Owner following a termination for the Owner's convenience, if any.)

ARTICLE 21 CLAIMS AND DISPUTES

§ 21.1 Claims, disputes, and other matters in question arising out of or relating to this Contract, including those alleging an error or omission by the Architect but excluding those arising under Section 16.2, shall be referred initially to the Architect for decision. Such matters, except those waived as provided for in Section 21.11 and Sections 15.7.3 and 15.7.4, shall, after initial decision by the Architect or 30 days after submission of the matter to the Architect, be subject to mediation as a condition precedent to binding dispute resolution.

§ 21.2 Notice of Claims

§ 21.2.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 18.2, shall be initiated by notice to the Architect within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 21.2.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 18.2, shall be initiated by notice to the other party.

§ 21.3 Time Limits on Claims

The Owner and Contractor shall commence all claims and causes of action against the other and arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in this Agreement, whether in contract, tort, breach of warranty, or otherwise, within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 21.3.

§ 21.4 If a claim, dispute or other matter in question relates to or is the subject of a mechanic's lien, the party asserting such matter may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 21.5 The parties shall endeavor to resolve their disputes by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with their Construction Industry Mediation Procedures in effect on the date of this Agreement. A request for mediation shall be made in writing, delivered to the other party to this Agreement, and filed with the person or entity administering the mediation. The request may be made concurrently with the binding dispute resolution but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 21.6 If the parties have selected arbitration as the method for binding dispute resolution in this Agreement, any claim, subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association, in accordance with the Construction Industry Arbitration Rules in effect on the date of this Agreement. Demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 21.7 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation; (2) the

arbitrations to be consolidated substantially involve common questions of law or fact; and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 21.8 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, any party to an arbitration may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described in the written Consent.

§ 21.9 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to this Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 21.10 Continuing Contract Performance

Pending final resolution of a Claim, except as otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 21.11 Waiver of Claims for Consequential Damages

The Contractor and Owner waive claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 20. Nothing contained in this Section 21.11 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*

CONTRACTOR *(Signature)*

(Printed name and title)

(Printed name and title)

SECTION 00610 - CONTRACT PERFORMANCE AND PAYMENT BOND
(Ohio Revised Code 153.57)

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned (“Contractor”) as principal and _____ as sureties, are hereby held and firmly bound unto the Tri-County Board of Recovery and Mental Health, as obligee, in the penal sum of _____ Dollars (\$ _____), for the payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

Signed this _____ day of _____, _____.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH that whereas, the above-named principal did on the _____ day of _____, 2021, enter into a contract with the Tri-County Board of Recovery and Mental Health, for New Administration & Training Building, which said contract is made a part of this bond the same as though set forth herein:

Now, if the said Contractor shall well and faithfully do and perform the things agreed by the contractor to be done and performed according to the terms of said contract; and shall pay all lawful claims of subcontractors, material suppliers, and laborers, for labor performed and materials furnished in carrying forward, performing, or completing of said contract; and shall keep the work in repair for a period of one year after the date of final acceptance of the Work as described herein above, and shall indemnify, save and hold harmless the Owner from all liens, charges, losses, costs, and damages of every kind and nature whatsoever, including damages to property and persons caused by the acts of negligence of said Contractor and/or deficiencies in materials; we agreeing and assenting that this undertaking shall be for the benefit of any material suppliers or laborer having a just claim, as well as for the obligee herein, then this obligation shall be void; otherwise the same shall remain in full force and effect; and surety shall indemnify the obligee against all damage suffered by failure of the principal to perform the contract according to its provisions and in accordance with the plans, details, specifications, and bills of material therefore and to pay all lawful claims of subcontractors, material suppliers, and laborers for labor performed or material furnished in carrying forward, performing, or completing the contract and surety further agrees and assents that this undertaking is for the benefit of any subcontractor, material supplier, or laborer having a just claim, a swell as for the obligee; 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 said surety hereby stipulates and agrees that, upon receiving written notice from the Owner that the principal has failed to perform the things agreed by it to be done according to the terms of the Contract, or to pay lawful claims of subcontractors, material suppliers and laborers, then the surety shall assume the performance of these things and make such payments in lieu of the principal; and shall undertake to do so within ten days of receipt of written notice from the Owner. The said surety hereby stipulates and agrees that it understands the usual case in work of the class included in the Contract to be completing the Contract and paying lawful claims is likely to exceed the remaining monies due under the Contract. The surety further stipulates and agrees that its obligation includes the complete performance of all remaining items under the Contract and the payment of all lawful claims for labor performed and materials furnished in the Contract, without regard to the amount of remaining monies due under the Contract.

The said surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of the said contract or in or to the plans or specifications therefore shall in any wise affect the obligations of said surety on its bond. The surety further stipulates that it is authorized to execute bonds in the State of [Ohio](#) and that the liability incurred is within the limits of [Section 3929.02 of the Revised Code](#).

Signed and sealed this _____ day of _____, _____.

(PRINCIPAL) (Seal)

By _____

It's _____
(Title)

(SURETY) (Seal)

By _____

It's _____
(Title)

(NAME OF SURETY'S AGENT)

Surety Agent's Address: _____

Surety Agent's Telephone Number _____

Surety Agent's Fax Number _____

SECTION 000800 - SUPPLEMENTARY CONDITIONS

PART 1: GENERAL

1.1 GENERAL REQUIREMENTS

- A. This section contains modifications and conditions to the "AIA Document A104-2017 "Standard Abbreviated Form of Agreement between Owner and Contractor.", Articles 1-21. Where a portion of the Form of Agreement is modified or deleted by these Supplementary Conditions, the unaltered portions of the Form of Agreement shall remain in effect.

1.2 MODIFICATIONS

ARTICLE 3 – CONTRACT SUM

- A. DELETE **Section 3.3** *Cost of the Work Plus Contractors Fee* and all 3.3 subparagraphs.
- B. DELETE **Section 3.4** *Cost of the Work Plus Contractors Fee with a Guaranteed Maximum Price* and all 3.4 Subparagraphs.

ARTICLE 4 – PAYMENT

- A. ADD the following Subparagraphs **4.1.4.1** and **4.1.4.2** to Paragraph 4.1.4:
 - 4.1.4.1** Payments for Labor incorporated into the Work will be at the rate of 92% of the amount set forth in each Contractor's payment application and approved by the Architect until the Work is 50% complete. When the Work is 50% complete, the payment for labor incorporated into the Work will be at the rate of 100% of the amount set forth in the Contractor's payment application and approved by the Architect. Retained percentage shall be paid to each Contractor, along with the Final Payment, at the completion of the entire Contract, and subject to provisions of Final Completion. The total Labor retained for each Contractor shall be calculated based upon 4% of the total Labor amount of each Contract.
 - 4.1.4.2** Payments for materials and equipment will be paid at the rate of 92% of the invoice cost (not to exceed the bid price of any unit prices) of materials and equipment delivered to the Project Site or other storage site approved by the Architect. The balance of the invoice value shall be paid when the materials or equipment are incorporated into the Work.
- B. ADD the following Subparagraph **4.2.2.1** to Paragraph 4.2.2:
 - 4.2.2.1** Final payment will be made to the Contractor when all outstanding items on the most recent updated Punch List are completed to the Owner's satisfaction.

ARTICLE 7 – GENERAL PROVISIONS

- A. ADD Subparagraphs **7.3.1** and **7.3.2** to Paragraph 7.3 *The Work*.

- 7.3.1** The Contractor Acknowledges and agrees that the Contract Documents are sufficient to provide for the completion of the work and include all Work, whether or not shown or described, which reasonably may be inferred to be required or useful for the completion of the Work in accordance with all applicable laws, codes, and professional standards.
- 7.3.2** In the case of an inconsistency between Drawings and Specifications or within any Contract Document not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Architect's interpretation at no additional costs.
- B. ADD Subparagraph **7.5.2.1** to Paragraph 7.5.2.
- 7.5.2.1** Prior to execution of the Agreement, the Contractor acknowledges and represents that it and each Subcontractor evaluated and satisfied themselves as to the conditions and limitations under which the Work is to be performed, including, without limitation: (i) the location, condition, layout, and nature of the Project site and surrounding areas; (ii) general prevailing climatic conditions; (iii) anticipated labor supply and costs; (iv) availability and cost of materials, tools, and equipment; and (v) other similar issues. The Owner and the Architect assume no responsibility or liability for physical condition or safety of the areas of the Project site that is under the control of any one or more of the Contractors or that is part of the Work. Except as set forth in Paragraph 10.3. the Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or the Contract Time in connection with any failure by the Contractor or any Subcontractor to have complied with the requirements and representations of this subparagraph.
- C. REPLACE Paragraph **7.6** *Digital Use and Transmission* with the following:
- 7.6. Digital Use and Transmission**
The Contractor shall complete the CAD Agreement and Waiver for use of computer generated electronic files in available in SECTION 000900 – CAD Agreement and Waiver.
- D. DELETE Paragraph 7.10 *Relationship of the Parties*.
- E. REPLACE Paragraph **7.10** with the following:
- 7.10 BASIC DEFINITIONS**
- 7.10.1 APPROVED EQUAL:**
An Approved Equal is an item approved by the Architect as meeting the level of quality specified for the product for which the equal is proposed. An Approved Equal shall become a Standard, as defined in the Instructions to Bidders, upon acceptance by the Architect and approval by the Owner.
- 7.10.2 ADDENDUM:**
An Addendum is a letter or form clarifying, amending or interpreting the Contract Documents issued before the receipt of bids.

- 7.10.3 PRODUCTS:**
Products are new material, machinery, components, equipment, fixtures, and systems forming the Work, but do not include machinery and equipment used for preparation, fabrication, conveying, and erection of the Work. Products may also include existing materials or components required for reuse.
- 7.10.4 FURNISH OR SUPPLY:**
To furnish or supply is to supply and deliver to the Project site, unload, and inspect for damage in preparation for assembly, installation, and similar operations.
- 7.10.5 INSTALL:**
To install is to unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, or other operations necessary for the incorporation of materials and equipment into the Project ready to use.
- 7.10.6 PROVIDE:**
To provide is to furnish and install, complete and ready for the intended use, and pay all costs in connection therewith.
- 7.10.7 CONTRACTOR:**
The term "Contractor" shall refer to each Contractor with which the Owner has entered into a written agreement for Work related to the Project and shall apply to each such Contractor, unless a reference is made to a specific Contractor by trade.
- 7.10.8 CONTRACTORS CONSTRUCTION SCHEDULE:**
The term " Contractor's Construction Schedule" refers to the schedule prepared by the General Trades Contractor for the Project as provided in Paragraph 9.8 that incorporates the individual Contractor schedules for Work and the milestones identified in the Contract Documents.
- 7.10.9 BOND:**
The term "Bond" refers to the Contract Bond included in the Contract Documents, furnished by the Contractor and the Contractor's surety to provide assurance that the Contractor will perform the Contract and make the required payments. The Bond can be provided in the form of either (1) the Bid Guaranty and Contract Bond or (2) the Contract Performance and Payment Bond, if the Contractor provided a separate bid guaranty.
- 7.10.10 CLAIM AFFIDAVIT:**
The term "Claim Affidavit" refers to the sworn documents containing a claim on funds that are due to a Contractor, created by statute in favor of a person or entity supplying labor, materials, or services for the value of the labor, materials, or services supplied.

ARTICLE 8 – OWNER

- A. ADD the following Paragraph **8.4** to ARTICLE 8:

- 8.4** In no event shall the Owner, or the Architect have control over, charge of, or any responsibility for construction means, manners, methods, techniques, sequences, or procedures or for safety precautions and programs in connection with the Work,

notwithstanding any of the rights and authority granted the Owner or the Architect in the Contract Documents

ARTICLE 9 – CONTRACTOR

- A. ADD the following Subparagraphs **9.1.4** through **9.1.8** to Section 9.1 *Review of Contract Documents and Field Conditions by Contractor*:

9.1.4 Where there is a conflict in or between the Drawings and Specification, the Contractor shall be deemed to have estimated the most expensive method of doing the Work and the largest quantity of materials and time required. Only changes or interpretations covered by Addenda or written from the Architect will be permitted during construction of the Work.

9.1.5 The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other Contractors, is not guaranteed by the Architect or by the Owner. No compensation will be allowed because of differences between actual measurements and/or elevations and dimension and/or elevations indicated on the Drawings. The Contractor shall assume full responsibility for accuracy of measurements obtained at the Work site.

9.1.6 The Contractor shall satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other Work, the Contractor shall verify at the site, all dimensions relating to such existing or other Work. Any errors due to the Contractor's failure to verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the Contractor at no additional cost to the Owner.

9.1.7 Mechanical and Electrical Drawings are diagrammatic only. Actual work involved shall be installed from approved shop drawings with all measurements obtained at the Work site.

9.1.8 Dimensions that are lacking shall be obtained from the Architect. **IN NO CASE SHALL DRAWINGS BE SCALED.** Large scale and full-size drawings shall be followed in preference to small-scale drawings, and figured dimensions rather than scale.

- B. ADD the following Subparagraphs **9.2.3** though **9.2.6** to Section 9.2 *Supervision and Construction Procedure*:

9.2.3 Any requirements that obligated the Contractor shall be required for each Subcontractor and material supplier to the Contractor. The Owner shall not be responsible for any term of the Contract between the Contractor and any Subcontractor or material supplier that is inconsistent with the provisions of the Contract Documents.

9.2.4 The Contractor shall maintain at the Project site and accessible to the Architect, Owner and any of the Contractors; the official set of Drawings and Specifications stamped approved by the State Building Official, and a copy of the Drawings and Specifications.

- 9.2.5** Daily Construction Report. The Contractor shall maintain on a daily basis a report, in form satisfactory to the Architect and Owner, that includes Project-related information, including but not limited, number of workers on site for the Contractor, identification of equipment for the Contractor, description of the Work accomplished by the Contractor on that day, a description of problems encountered by the Contractor, and other similar relevant Project data.
- 9.2.6** The Contractor shall keep an accurate record of all approved changes made to the Drawings to show actual installation where installation varies from Work as originally shown, including the exact location and depth of underground utility lines.
- C. ADD the following Subparagraph **9.3.2.1** to Paragraph 9.3.2:
- 9.3.2.1** Possession or consumption of alcoholic beverages or drugs, tobacco or other noxious behavior on the site is strictly prohibited. Radios, music players, or any unnecessary noise of any kind is strictly prohibited. Smoking is not permitted on the project site or within the buildings. Firearms or weapons of any type are not permitted on the project site. Pornographic or sexually suggestive materials are not permitted on the project site. Violators of any of these rules and regulations shall be promptly removed from the site
- D. ADD the following Subparagraphs **9.4.1** to Section 9.4 *Warranty*:
- 9.4.1** In addition to other warranties, guarantees, or obligations set forth in the Contract Documents or applicable as a matter of law and not in limitation of the terms of the Contract Documents, the Contractor warrants and guarantees that:
- .1 The Owner will have good title to the Work, and materials and equipment incorporated into the Work will be new.
 - .2 The work and materials and equipment incorporated into the work will be free from defects, including defects in the workmanship or materials.
 - .3 The work and equipment incorporated into the Work will be fit for the purpose for which they are intended.
 - .4 The Work and materials and equipment incorporated into the work will be merchantable.
 - .5 The Work and materials and equipment incorporated into the Work will conform to the Contract Documents.
- E. ADD the following Subparagraphs **9.5.1** and **9.5.2** to Paragraph 9.5 *Taxes*:
- 9.5.1** Materials purchased for use or consumption in connection with the proposed work will be [exempt from the State of Ohio Sales Tax as provided in Section 5739.02 of the Revised Code of Ohio and also from the State of Ohio Use Tax, Section 5741.01](#)
- 9.5.2** Purchases by the Contractor of expendable items such as form lumber, tools, oils, grease, fuel or equipment rentals, are subject to the application of the [Ohio Sales or Use Tax](#).
- F. ADD the following Subparagraphs **9.6.3** and **9.6.4** to Section 9.6 *Permits, Fees, Notices, and Compliance with Laws*:

- 9.6.3** The Contractor shall secure and pay for all building permits and governmental fees, licenses and inspections necessary for proper execution of and completion of the Contract, legally required when the bids are received, or negotiations concluded.
- 9.6.4** The Contractor is cautioned to pursue and verify exact costs of permits and licenses, include specific costs in the bid, and procure permits and licenses in an expeditious manner to avoid fee increases. No additional costs or change orders will be permitted because of casual or approximated fees, or escalation of fees occurring after the award of the Contract.
- G. ADD Subparagraphs **9.8.3** and **9.8.4** to Section 9.8 *Contractor's Construction Schedules*:
- 9.8.3** Use the Project Time Schedule to plan, organize, and execute the Work, record and report actual performance and progress, and show how the Contractor plans to coordinate all remaining Work by the dates for Substantial Completion and close-out of the Contracts. The Contractor shall monitor the progress of the Work for conformance with the Project Time Schedule and initiate revisions to the Project Time Schedule, required by the Contract Documents.
- 9.8.4** The Contractor shall perform the Work in general accordance with the most recent Project Time Schedule. The periods of time in the approved Project Time Schedule and the dates for substantial completion and project closeout contained therein are of the essence to this contract. The contractor shall prosecute its work in accordance with the Project Time Schedule, including any amendments thereto and specifically including the milestone dates included therein when applicable to the Contractor's Work.
- H. ADD Subparagraph **9.15.3** to Section 9.15 *Indemnification*:
- 9.15.3** The Contractor's indemnity obligations under this Paragraph 3.18 shall also specifically include, without limitation, all fines, penalties, damages, liability, costs, expenses, (including, without limitation, reasonable attorney fees), and punitive damaged (if any) arising out of, or in connection with any: (i) violation of or failure to comply with any law, statute, ordinance, rule, regulation, code or requirement of a public authority that bears upon the performance of the Work by the Contractor, a subcontractor, or any person or entity for whom either is responsible; (ii) means, manners, methods, procedures, techniques or sequences of execution or performance of the Work; and (iii) failure to secure and pay for permits, fees, approvals, licenses, and inspections as required under the Contract Documents, or any violation of any permit or other approval of a public authority applicable to the Work, by the Contractor, a Subcontractor, or any person or entity for which either is responsible.
- I. ADD New Section **9.16 Superintendent** and new Subparagraphs **9.16.1** through **9.16.4**:
- 9.16.1** The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.
- 9.16.2** The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing

stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

9.16.3 The Contractor's superintendent shall be on the project at all times when work is being done. Immediately after the award of the Contract, the Contractor shall submit an outline experience record of the intended Project Superintendent in order that the Architect may review his/her qualifications.

9.16.4 Until completion and acceptance of the work, Contractor shall not change or remove the superintendent except with the consent or direction of the Architect. If the Contractor proposes to change or remove the superintendent, the Contractor shall submit to the Architect a written request for the termination or change, including the justification for the termination or change, the name and qualifications for the proposed replacement, and the time frame within which the replacement is proposed to take place. The Contractor shall promptly provide any related additional information the Architect or Owner requests.

ARTICLE 13 – CHANGES IN THE WORK

A. ADD Subparagraph **13.1.1** to Paragraph 13.1.

13.1.1 When a Bulletin or Proposal Request is issued to the Contractor requesting cost for proposed changes in the Work, the Contractor shall submit an **ITEMIZED COST BREAKDOWN** on Work involved, including costs for identified materials, labor utilization, overhead and profit, supervision, additional storage of equipment and material (if applicable), additional insurance coverage and the payment and performance bond required by the Contract Documents, additional equipment leased or rented from non-affiliates (but not equipment owned by the Contractor or his affiliates) and additional expenses for the on-site project office for the rental of the office, basic phone service, gas, water, and electricity. Overhead and profit shall be limited to the percentages included in Paragraph 13.5. The Bulletin or Proposal Request, if accepted by the Owner, in whole or in part, will subsequently be incorporated into the Work, to the extent accepted, by a Change Order. **LUMP SUM ESTIMATES WILL BE REJECTED UPON SUBMITTAL.**

B. ADD Paragraph **13.5** to ARTICLE 13 – CHANGES IN THE WORK.

13.5 The allowance for the combined Overhead and Profit, included in the total price to the Owner, shall be based on the following schedule: (1) 12% for changes up to and including \$5,000; (2) 10% for changes up to and including \$10,000; (3) 8% for changes up to and including \$20,000; and 6% for changes in excess of \$20,000.

ARTICLE 14 – TIME

A. ADD Subparagraph **14.2.1** to Paragraph 14.2.

14.2.1 The date of commencement of the Work is the effective date established by the Notice to Proceed given by the Owner.

ARTICLE 15 – PAYMENT AND COMPLETION

- A. DELETE Paragraph **15.2** *Control Estimate* and all Subparagraphs **15.2.1** through **15.2.1** through **15.2.5**.
- B. REPLACE **15.2** with the following:
- 15.2** On Contracts totaling \$15,000.00 or more, an escrow account shall be established in a financial institution, as escrow agent, selected by the Owner at the time Contracts are executed. The establishing of and operation of the escrow account shall be in compliance with the requirements of [Ohio Revised Code, Sections 153.13 and 153.63](#).
- C. DELETE Paragraph **15.3.2** and REPLACE with following:
- 15.3.2** The form of Application for Payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet.
- D. ADD the following Paragraphs **15.3.3.1** to Paragraph 15.3:
- 15.3.3.1** NO Payments will be made for materials stored off the site.
- E. ADD the following Paragraphs **15.3.5** to Section 15.3 *Applications for Payment*:
- 15.3.5** It is hereby agreed between the Owner and the Contractor that each properly executed "Application and Certificate for Payment" (AIA Document G702 and Continuation Sheet G703) is a valid lien release, as stated on the form, and the Contractor, thereby, indemnifies the Owner in accordance with Article 9 of the General Conditions.
- F. DELETE Subparagraphs 15.4.3.1 through 15.4.3.7 of Paragraph 15.4.3 and REPLACE with the following Subparagraphs **15.4.3.1** through **15.4.3.9**:
- .1** The Contractor is in default of the performance of any of its obligations under the Contract Documents, including but not limited to: failure to provide sufficient skilled workers; work, including equipment or materials, which is defective or otherwise does not conform to the Contract Documents; failure to conform to the Project Time Schedule; and failure to follow the directions of or instructions from the Architect or the Owner;
- .2** The Contractor is in default of the performance of any of its obligations under another contract that it has with the Owner;
- .3** The filing of third party claims, including claims of other contractors, or reasonable evidence that third party claims have been or will be filed;
- .4** The Work has not proceeded to the extent set forth in the Application for Payment.
- .5** Any representations made by the Contractor are untrue;
- .6** The failure of the Contractor to make payments to its Subcontractors, material suppliers, or laborers;
- .7** Damage to the Owner's property or the property of another Contractor or person.
- .8** The determination by the Architect that there is a substantial possibility that the work cannot be completed by the unpaid balance of the Contract Sum; and/or
- .9** Liens filed or reasonable evidence indicating the probable filing of such liens

G. ADD the following Subparagraphs **15.7.2.1** and **15.7.2.2** to Paragraph 15.7.2:

15.7.2.1 The final Application for Payment shall be itemized, and the Contractor shall ensure that the final Application for Payment transmitted to the Architect is accompanied by the following documents, if not previously delivered to the Architect:

- .1 Certificate of Substantial Completion (signed and dated).
- .2 Final Punch List (prepared by the Architect).
- .3 Affidavits and Waivers of Lien Claims of the Contractor, all Subcontractors and material suppliers.
- .4 Consent of Surety for release of final payment.
- .5 Certificate of Occupancy.
- .6 Inspection certificates required, such as Pressure Piping, Electrical, etc.
- .7 Letter of Approval for fire suppression system.
- .8 Operating and maintenance manuals, submitted to the Architect according to SECTION 017823 *Operation and Maintenance Data*.
- .9 Neatly and accurately marked sets of As-Built Drawings and other Contract Documents reflecting the actual construction of the Project.
- .10 Reproducible detailed Drawings reflecting the exact location of any concealed utilities, mechanical, or electrical systems and components.
- .11 Evidence that all the punch-list items have been completed.
- .12 Original Certificate of Plan Approval, signed and dated.
- .13 Assignment to the Owner of all Warranties and Guaranties, including the most recent address and telephone number of any Subcontractor, material suppliers, or manufacturers.
- .14 Final certified payroll reports.
- .15 An affidavit to certify that the Contractor has complied with all requirements of [Chapter 4115, Ohio Revised Code](#); and;
- .16 Other documents required by the Contract Documents

15.7.2.2 Upon completion of the Work, the Contractor shall organize the As-Built Drawings , certify to the accuracy of the As-Built Drawings by signature thereon, and submit to the Architect according to SECTION 017839 - *Project Record Documents*.

ARTICLE 17 – INSURANCE AND BONDS

A. ADD the following Subparagraph **17.1.1.1** and **17.1.1.2** to Paragraph 17.1.1:

17.1.1.1 The Contractor shall purchase and maintain such liability and other insurance as will protect the Contractor from claims described below which may arise out of or result from the Contractor’s performance or obligations under the Contract Documents, whether due to action or inaction by the Contractor or any person for whom the Contractor is responsible.

- .1 Claims under workman's compensation, occupational sickness or disease, disability benefit and other similar employee benefit acts;
- .2 Claims for damages because of bodily injury, disease, illness, death or personal injury, and other claims usually covered by bodily injury liability insurance;
- .3 Claims for damages because of injury to or destruction of property and other claims usually covered by property damage liability insurance.
- .4 If this insurance is written on a Commercial Liability Policy Form, ACORD Form 25S will be acceptable.

17.1.1.2 A Commercial General Liability policy and Business Automobile Liability policy, separately or combined, shall be maintained to provide insurance as described below. Such Commercial General Liability and Business Automobile Liability insurance may be either Combined Single Limits or Split Limits as provided below. An Umbrella or Excess Liability policy may be used in combination with the Commercial General Liability and Business Automobile insurance to meet such limits (refer to Section 000820 and provide whichever is largest coverage).

- .1 Contracts in excess of \$100,000 but not more than \$5 million shall require coverage in the amount of not less than \$3 million general aggregate and per occurrence.
- .2 Such policies shall be endorsed to provide that the General Aggregate Limit applies separately to each of the insured Contractor's projects.
- .3 If this insurance is written on a Commercial Liability Policy Form, ACORD Form 25S will be acceptable.

B. ADD the following Subparagraphs **17.1.4.1** and **17.1.4.2** to Paragraph 17.1.4:

17.1.4.1 A Commercial General Liability policy and Business Automobile Liability policy, separately or combined, shall be maintained to provide insurance as described below. Such Commercial General Liability and Business Automobile Liability insurance may be either Combined Single Limits or Split Limits as provided below. An Umbrella or Excess Liability policy may be used in combination with the Commercial General Liability and Business Automobile insurance to meet such limits (refer to Section 000820 and provide whichever is largest coverage).

- .1 Contracts in excess of \$100,000 but not more than \$5 million shall require coverage in the amount of not less than \$3 million general aggregate and per occurrence.
- .2 If this insurance is written on a Commercial Liability Policy Form, ACORD Form 25S will be acceptable.

17.1.4.2 If Commercial General Liability and Business Automobile Liability insurance is written with Split Limits, the following limits shall be provided (refer to Section 000820 and provide whichever is largest coverage).

- .1 Contracts in excess of \$100,000 but not more than \$5 million shall require coverage in the amount of not less than \$1 million for injuries, including death, to one person, and \$1 million per occurrence and \$1 million property damage, together with an Umbrella or Excess Liability policy of not less than \$2 million per occurrence.

C. DELETE Paragraphs **17.1.6** through **17.1.9** of ARTICLE 17 – INSURANCE AND BONDS:

D. ADD the following Subparagraph **17.1.10.1** to Paragraph 17.1.10:

17.1.10.1 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Owner's Representatives, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

E. Make the following changes to Section 17.2.2. PROPERTY INSURANCE:

17.2.2.1 DELETE the first four (4) words: "*The Owner shall purchase*":

REPLACE with the following: "*The Contractor shall purchase*"

ARTICLE 19 – MISCELLANEOUS PROVISIONS

A. ADD the following Paragraphs **19.7** to Paragraph **19.12** to ARTICLE 19:

19.7 Drawings and Specifications:

All inquiries shall be directed to the Architect only. Certain specifications and certain of the other Contract Documents, including these Supplementary Conditions, are of the simplified type and include incomplete sentences. Omissions of words or phrases, such as, "the Contractor shall", "in conformity therewith", "shall be", "as noted", "a", "an", "the", and "all" are intentional. Omitted words shall be supplied by inference in the same manner as they are when a note occurs on the drawings. Words "shall be" or "shall", shall be supplied in inference particularly when a colon is used within sentences or phrases.

19.8 The normal job working hours shall be established by the General Contractor and approved by the Owner.

During established working hours it shall be the responsibility of the Prime Contractor and Subcontractors to provide all necessary skilled craftsmen as to cause no delays to any phase of construction.

The Contractor shall place orders for materials and equipment to be employed in the work, other than those herein designated to be furnished by the Owner, as soon as possible after the award of the Contract

19.9 Contractor's Title to Material:

No materials or supplies for the work shall be purchased by the Contractor or by any Subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants that he has good title to all materials and supplies used by him in the work, free from all liens, claims, or encumbrances

19.10 Use of Premises:

The Contractor shall confine his apparatus, the storage of materials and the operations of his laborers to limits indicated by laws, ordinances, permits or directions of the Architect and shall not unreasonably encumber the premises with materials. Damage to roads or other features of the grounds, resulting from hauling,

storage of materials or other activity connected with the Work shall be repaired and paid for by the Contractor concerned, to the satisfaction of the Architect

19.11 Guarantee:

The Contractor shall guarantee workmanship and materials for one year from the date of acceptance by the Architect, unless contract documents call for warranty of greater length, and shall leave the Work in perfect order at completion.

Should defects develop within the guarantee period, the Contractor shall, upon written notice of same, remedy the defects, at his/her own cost and expense, and reimburse the Owner for all damages to other work, whether caused by the defects or the work of correcting same, the Performance Bond furnished by the Contractor as part of this contract shall remain in effect until the expiration of the guarantee period as assurance of the Contractor's obligation to meet the guarantee herein stipulated.

19.12 Equal Opportunity

The prohibitions against discrimination and intimidation on account of race, creed, or color, and the provisions as to forfeitures to be applied in the event of violation of Contract terms regarding same, [as contained in Sections 153.59 and 153.60, and Sections 4112.01 through 4112.99, inclusive, of the Ohio Revised Code](#), shall apply to all Contracts entered into in conjunction with the work

END OF SECTION 000800

SECTION 000900 – CAD AGREEMENT AND WAIVER

At the Architect's and Engineer's sole discretion and without obligation, graphic portions of the contract documents are made available for use by the Contractor/Supplier/Fabricator (hereby known as User) in electronic format. These electronic documents are proprietary, and remain the Architect's Instruments of Service and shall be for use solely with respect to this Project, as provided in the Standard Form of Agreement between Owner and Architect. The User acknowledges that receiving these files in no way relieves the User from the responsibility for the preparation of shop drawings, coordination drawings, etc. as set forth in the Contract Documents. The User agrees that all requested electronic files will be used only by the recipient for the stated Project for which they are intended, and in no manner given to any other entity for any other usage.

The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other Contractors, is not guaranteed by the Architect or by the Owner. No compensation will be allowed because of differences between actual measurements and/or elevations and dimension and/or elevations indicated on the Drawings. The Contractor shall assume full responsibility for accuracy of measurements obtained at the Work site.

The User acknowledges that the information provided in these files is not a substitution or replacement for the Contract Documents and does not become a Contract Document. The User acknowledges that neither the Architect, the Consultants, the Client, nor the Owner make any warranty or representation that the information contained in these files reflect the Contract Documents in their entirety. The User assumes full responsibility in the use of these files, including the responsibility to see that all manual modifications, Addenda, Bulletins, Clarifications, Supplemental Instructions, and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.

The electronic documents shall be stripped of the Project's name and address, the Architect's and any Consultants name and address, and any professional licenses indicated on the Contract Documents, (and all dimensions, verbiage, and statistical information). Use of these electronic documents is solely at the Contractor's risk, and shall in no way alter the Contractor's Contract for Construction.

The User agrees to indemnify, defend, and hold harmless Freytag & Associates. Inc., any Consultants, the Owner, the Client and any of their agents from any litigation resulting from the use of (by any means of reproduction or electronic media) these files. The Architect makes no representation regarding fitness for any particular purpose, or suitability for use with any software or hardware, and shall not be responsible or liable for errors, defects, inexactitudes, or anomalies in the data, information, or documents (including drawings, and specifications) caused by the Architect's or Consultant's computer software or hardware defects or errors; the Architect's or the Consultant's electronic or disk transmittal of data, information or documents; or the Architect's or Consultant's reformatting or automated conversion of data, information or documents electronically or disk transmitted from the Architect's Consultants to the Architect. The Contractor waives all claims against the Architect, its employees, officers, and Consultants for any and all damages, losses, or expenses the Contractor may incur from such defects or errors in the electronic documents. Furthermore, the contractor shall indemnify, defend, and hold harmless the Architect and Consultants together with their respective employees and officers, from and against any legal claims, suits, demands, causes of action, losses, damages or expenses (including all attorney's fees and litigation expenses) attributed to errors or defects in data, information or documents, including drawings and specifications, resulting from the Contractor's distribution of electronic documents to other Contractors, persons or entities.

Electronic documents are available as DXF, DWG, or PDF formats. Electronic documents are available through the Architect's or Engineer's office. The undersigned acknowledges request of electronic CAD files in DXF, DWG, or PDF format for the above project.

(Please print or type all answers)

User: _____ Date: _____

User Mailing Address: _____

User E-Mail Address: _____

Signed: _____ Title: _____

List of Drawing Sheets Requested: _____

Preferred Electronic File Format: .dwg .dxf .pdf

Preferred Transfer Method: CD (U.S. Mail) E-mail

Confirm final costs with Architect prior to payment. At the Architect's discretion, the User may be instructed how to download electronic files directly from a restricted access website.

THIS 2 PAGE FORM MUST BE RECEIVED WITH AN ORIGINAL SIGNATURE, ALONG WITH ANY PAYMENT, BEFORE ANY FILES WILL BE TRANSFERRED TO THE USER.

SECTION 000950 – PREVAILING WAGE RATES

**Ohio Department of Commerce
Division of Labor and Worker Safety
Wage and Hour Bureau**

Prevailing Wages

The Contractor shall comply with the prevailing wage requirements described under ORC Chapter 4115 that include, without limitation, the requirements described under this description.

If the Project is subject to payment of prevailing wage rates, the Contractor shall:

1. pay to labors and mechanics performing Work on the Project the prevailing wage rates of the Project locality, as determined by the Ohio Department of Commerce, Wage and Hour Bureau;
2. post in a prominent place readily accessible by all works on the Site, a legible listing of the current classifications of laborers, workers, and mechanics employed under this Contract;
3. ensure that the rates posed are current and remain posted in legible condition during the period of the Contract; and
4. not be entitled to an increase in the Contract Sum on account of an increase in prevailing wage rates, except as otherwise provided by Applicable Law.

The Contractor may access the Ohio Department of Commerce, Wage & Hour Bureau at its website, <http://198.234.41.198/w3/webwh.nsf/pages/PrevailingWageBid>, to obtain the current wage rates.

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SECTION 003132 – GEOTECHNICAL REPORT

PART 1 - GENERAL

1.1 SUMMARY

- A. Geotechnical Report for this site follows:



Professional Service Industries, Inc.
5599 Webster Street, Dayton, OH 45414
Phone: (937) 898-1200
Fax: (937) 898-1230

Tri-County Board of Recovery & Mental Health Services
C/O Carter & Cline
3349 North Montgomery County Line Road
Tipp City, Ohio 45371

Attn: Ms. Kimberly Carter Cope

Re: Geotechnical Exploration Report
Proposed Tri-County Health Development
County Road 25A
Troy, Miami County, Ohio 45373

Dear Ms. Carter Cope:

Thank you for choosing Professional Service Industries, Inc. (PSI), an Intertek Company, as your consultant for the Proposed New Development for Tri-County Board of Recovery and Mental Health Services in Troy, Miami County, Ohio. Per your authorization, PSI has completed a geotechnical exploration for the referenced project. The results of the study are discussed in the accompanying report.

It is considered imperative that the geotechnical engineer and/or their representative be present during earthwork operations, foundation and floor slab installations to observe the field conditions with respect to the design assumptions and specifications. PSI will not be held responsible for interpretations and field quality control observations made by others.

If you have any questions pertaining to this report, please contact our office at (937) 898-1200. PSI would be pleased to continue providing geotechnical services throughout the implementation of the project, and we look forward to working with you and your organization on this and future projects.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC.

R. Andrew Schlarman II, P.E.
Branch Manager

The above Professional Engineering Seal and signature is an electronic reproduction of the original seal and signature. This electronic reproduction shall not be construed as an original or certified document.



Paul S. Hundley, P.E.
Regional Engineer / Principal Consultant

10-15-2018

cc: Client – Electronic Copy
Enclosures

Geotechnical Exploration Report
of
Proposed Tri-County Health Development
County Road 25A
Troy, Miami County, Ohio 45373

Prepared for
Tri-County Board of Recovery & Mental
Health Services
C/O Carter & Cline
3349 North Montgomery County Line Road
Tipp City, Ohio 45371

Prepared by
Professional Service Industries, Inc.
5599 Webster Street
Dayton, Ohio 45414

Report Date: October 15, 2018
PSI Project No. 01051337



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PROJECT INFORMATION

Project Authorization

The following Table summarizes (in chronological order) the Project Authorization History for the services performed and represented in this report by Professional Service Industries, Inc. (PSI):

| PROJECT TITLE: PROPOSED TRI-COUNTY HEALTH DEVELOPMENT –TROY, OHIO | | |
|--|-------------|--|
| Document and Reference Number | Date | Requested/Provided By |
| Request for Proposal | 04/27/2018 | Kimberly Carter Cope, Carter & Cline, Partner |
| PSI Quotation No.: 0105-243324 | 04/30/2018 | Andy Schlarman, P.E. and Paul Hundley, P.E. of PSI |
| Signed PSI Proposal | 08/28/2018 | Mark McDaniel, Executive Director, Tri-County Board of Recovery and Mental Health Services |

Project Description

PSI understands Carter & Cline and Freytag & Associates are developing information for a new development in a vacant lot located on the west side of County Road 25A, approximately 600 feet south of Lytle Road, in Troy, Miami County, Ohio. There will be a new two-story, steel-framed structure with masonry veneer and a concrete slab-on-grade floor. The first level of the building will measure approximately 36,000 square feet in plan area, and the second level of the building will measure 16,000 to 17,000 square feet in plan area. Therefore, the total square footage for the building is anticipated to be around 53,000 square feet. The proposed finish floor elevation of the new building will be 837.75 feet and existing elevations in the new building pad area are approximately 830 to 831 feet. Accordingly, the anticipated fills will be approximately 7 feet throughout the proposed building pad area. No loading information was provided, but for purposes of this report, PSI anticipates maximum column, wall and floor loads to be 150 kips, 5 kips per lineal foot and 150 pounds per square foot, respectively.

There will be “probable parking areas” surrounding the new building structure, but the amount of spaces is not known. Additionally, on the west end of the property, there will be storm water detention/future storage building/possible parking area.

The following Table lists the material and information provided for this project:

| DESCRIPTION OF MATERIAL | PROVIDER/SOURCE | DATE |
|--|------------------------|-------------|
| A drawing from Freytag & Associates titled, “Soil Boring Plan – Page SB1.0” dated March 13, 2018. | Carter & Cline | 04/27/2018 |
| A document titled, “Tri-County Board of Recovery and Mental Health Services” dated March 15, 2018 with known geotechnical information and subsurface investigation requirements. | Carter & Cline | 04/27/2018 |
| An aerial image showing the site location. | Carter & Cline | 04/27/2018 |



The following Table lists the structural loads and site features that are required for or are the design basis for the conclusions of this report:

| STRUCTURAL LOAD/PROPERTY | REQUIREMENT/REPORT BASIS | |
|--|------------------------------|--|
| BUILDING | R* | B* |
| Maximum Column Loads | 150 kips | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| Finish Floor Elevation and type | Not Provided / Slab-on-grade | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| Maximum Wall Loads | 5 kips per lineal foot | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| Maximum Floor Loads | 150 pounds per square foot | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| Settlement Tolerances | 1" Total, 3/4" Differential | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| GRADING | | |
| Planned grade variations at site, feet | ±3 ft | <input type="checkbox"/> <input checked="" type="checkbox"/> |
| Utility Depths | N/A | <input type="checkbox"/> <input type="checkbox"/> |

*"R" = Requirement indicates specific design information was supplied.

"B" = Report Basis indicates specific design information was not supplied; therefore, this report is based on this parameter.

The geotechnical recommendations presented in this report are based on the available project information, boring location and the subsurface materials described in this report. If any of the information noted above is incorrect, please inform PSI in writing so that we may amend the recommendations presented in this report, if necessary. PSI will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

Purpose and Scope of Services

The purpose of this study was to explore the subsurface conditions at the site and to prepare recommendations for foundation systems for the proposed construction. PSI’s contracted scope of services included drilling twenty (20) soil test borings, including nine (9) borings in the building footprint to depths of approximately 15 to 20 feet, five (5) borings in the proposed asphalt drive lane/parking lot areas drilled to a depth of 5 feet each, and six (6) borings in the storm water detention area to depths of approximately 15 feet each below the ground surface, select laboratory testing, and preparation of this geotechnical report. This report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents recommendations regarding the following:

- A general assessment of area geology based on our local knowledge and study of available geological literature
- Foundation system evaluations and the assessment of the feasibility of utilizing shallow foundations
- Design parameters required for the foundation system, including allowable bearing pressure, minimum foundation width, foundation bearing levels, and estimated total and differential settlements
- Site preparation as needed for support of foundations, slabs and pavement
- General location, description of materials encountered in the borings which may interfere with construction progress or structure performance, including existing fills, cobbles/boulders, or organic soils
- Identification of water levels encountered at the time of drilling
- Results of infiltration testing



- Recommendation of modulus of subgrade reaction, and analysis of the swell potential of surface soil based on index tests
- Recommendations for fill including the selection of materials for use and procedures for placement

The scope of services of this report does not include an environmental assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, groundwater, or air on, below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes. PSI has recently conducted a Phase I Environmental Site Assessment for this property.

PSI's scope also did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence or the amplification of the same. Client should be aware that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. The client should be aware that site conditions are outside of PSI's control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or reoccurrence of mold amplification.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The site for the proposed Tri-County Health Development is located at County Road 25A in Troy, Miami County, Ohio. The site latitude and longitude are approximately N 40.0600° and W -84.2145°, respectively.

At the time of drilling, the site consisted of a vacant lot covered with light vegetation and topsoil at the surface. Based on the Google Earth and PSI's site visit, the elevations across the development range from approximately 830 feet to 833 feet. The lot was bordered by existing agricultural fields to the west and south, County Road 25A to the east, and an existing, one-story office building to the north. The site drainage is predominately through surface infiltration.

Site Geology

Based on the on-line geologic map provided by the Ohio Geological Survey (available at <http://www.dnr.state.oh.us/OhioGeologicalSurvey/SurficialGeology/tabid/23586/Default.aspx>), the proposed site area is located in the Central Lowland Province, Till Plains Section, Southern Ohio Loamy Till Plains Region, with predominately ground moraine topography and outwash underlain by Silurian age bedrock (as part of the Wisconsinan Glaciation Period).

Subsurface Conditions

The site subsurface conditions were explored with twenty (20) soil test borings, including nine (9) borings in the building footprint to depths of approximately 15 to 20 feet, five (5) borings in the proposed asphalt drive lane/parking lot areas drilled to a depth of 5 feet each, and six (6) borings in the /future storage building/possible parking area to depths of approximately 15 feet each below the ground surface grades.

The boring locations and depths were suggested by PSI and reviewed by the client prior to drilling. PSI staked the borings in the field with the aid of a handheld GPS device and by measuring distances from available surface features. The surface elevations at the borings should be surveyed prior to construction activities.



The borings were advanced utilizing 2 ¼ inch inside diameter, hollow-stem auger drilling methods. Soil samples were routinely obtained during the drilling process. Selected soil samples were later tested in the laboratory to obtain soil material properties for the foundation and pavement recommendations. Drilling, sampling, and laboratory testing was accomplished in general accordance with ASTM procedures.

The surface material at the test boring locations consisted of 3 to 5.5 inches of topsoil. It should be expected that the surficial material thicknesses will vary between the boring locations.

Underlying the surficial soils at the soil test borings, natural soils consisting of Silt (ML), Silty Clay (CL-ML), Lean Clay (CL), Fat Clay (CH), Clayey Sand (SC), Clayey Gravel (GC), Well Graded Sand (SW), Poorly Graded Sand (SP), Well Graded Gravel (GW), and Poorly Graded Gravel (GP) with variable fractions of clay, sand, and gravel were encountered. The natural soils extended to the termination depths of the borings and exhibited Standard Penetration test values (N_{60} -values) ranging from 10 to 97 blows per foot (bpf) and moisture contents ranging from 2 to 29 percent.

The following Table briefly summarizes the range of results from the field and laboratory testing programs. Please refer to the attached boring logs and laboratory data sheets for more specific information:



Table 1
Soil Test Boring Field Results and Lab Moisture Summary

| SUMMARY OF SPT N VALUES, MOISTURE CONTENT & GROUND WATER LEVELS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------|---------------------------------|----------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------|---|
| Top of Soil Sampling Depth (ft) | SPT N Values (Blows/ft) | | | | | | | | | | | | | | | | | | | | Average | Top of Soil Sampling Depth (ft) | Moisture Content (%) | | | | | | | | | | | | | | | | | | | | Average | |
| | B-01 | B-02 | B-03 | B-04 | B-05 | B-06 | B-07 | B-08 | B-09 | B-10 | B-11 | B-12 | B-13 | B-14 | B-15 | B-16 | B-17 | B-18 | B-19 | B-20 | | | B-01 | B-02 | B-03 | B-04 | B-05 | B-06 | B-07 | B-08 | B-09 | B-10 | B-11 | B-12 | B-13 | B-14 | B-15 | B-16 | B-17 | B-18 | B-19 | B-20 | | |
| 1.0 | 13 | 10 | 14 | 16 | 35 | 13 | 11 | 17 | 16 | 14 | 20 | 14 | 13 | 10 | 14 | 10 | 14 | 24 | 11 | 10 | 15 | 1.0 | 29 | 23 | 26 | 15 | 22 | 20 | 19 | 19 | 18 | 22 | 22 | 21 | 19 | 16 | 21 | 20 | 21 | 18 | 19 | 20 | 21 | |
| 3.5 | 47 | 23 | 37 | 66 | 52 | 38 | 10 | 37 | 68 | 49 | 61 | 59 | 32 | 59 | 58 | 68 | 47 | 49 | 18 | 34 | 46 | 3.5 | 4 | 7 | 4 | 4 | 6 | 6 | 6 | 6 | 5 | 5 | 6 | 5 | 6 | 7 | 6 | 5 | 6 | 6 | 8 | 5 | 6 | 6 |
| 6.0 | 38 | 30 | 30 | SSR | 95 | 97 | | | | | | 10 | 52 | 40 | 97 | SSR | 58 | 56 | 30 | SSR | 53 | 6.0 | 4 | 8 | 10 | 4 | 4 | 5 | | | | | 11 | 5 | 5 | 4 | 2 | 6 | 5 | 7 | 5 | 6 | 6 | |
| 8.5 | 86 | SSR | 66 | 65 | 47 | 48 | | | | | | 20 | 25 | 21 | 49 | 30 | 13 | 38 | SSR | 38 | 42 | 8.5 | 9 | 13 | 10 | 7 | 11 | 10 | | | | | 22 | 16 | 6 | 4 | 5 | 10 | 7 | 12 | 10 | 10 | 10 | |
| 11.0 | | | | | | | | | | | | | | | | | | | 61 | | 61 | 11.0 | | | | | | | | | | | | | | | | | 13 | | | 13 | 13 | |
| 13.5 | SSR | 42 | 61 | 44 | 69 | 48 | | | | | | 45 | 23 | 23 | 20 | 20 | 24 | 79 | SSR | 35 | 41 | 13.5 | | 12 | 10 | 13 | 10 | 13 | | | | | 10 | 17 | 17 | 10 | 25 | 17 | 11 | 3 | 9 | 9 | 13 | |
| 18.5 | | | | | | | | | | | | 32 | | 42 | | 25 | | SSR | | 56 | 39 | 18.5 | | | | | | | | | | | | 9 | | 10 | | 14 | | 6 | | 11 | 10 | |
| Groundwater Level Reading and Borehole Caving Depth (ft) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water Level Encountered While Drilling | | | | 11.5 | 8.5 | 8.5 | 8.5 | 8.5 | 9.5 | NE | NE | NE | NE | NE | 13.0 | 9.0 | 11.0 | 13.0 | 12.0 | 9.7 | 11.0 | 8.5 | 9.8 | | | | | | | | | | | | | | | | | | | | | |
| Water Level Reading Encountered Upon Completion | | | | NE | NE | NE | NE | NE | NE | NE | NE | NE | NE | NE | NE | 8.7 | NE | NE | NE | NE | NE | NE | 6.0 | NE | | | | | | | | | | | | | | | | | | | | |
| Cave Depth of Boring Upon Completion | | | | 6.0 | 6.5 | 5.0 | 5.5 | 6.0 | 6.5 | NE | 3.0 | 3.0 | 3.0 | 3.3 | 9.0 | 8.5 | 4.0 | 4.0 | 8.0 | 7.5 | 6.0 | 8.0 | 7.0 | | | | | | | | | | | | | | | | | | | | | |

High Plasticity Clay

NE - Not Encountered

SSR - Split Spoon Refusal

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in the Appendix should be reviewed for specific information at individual boring locations. These records include soil descriptions, stratifications, penetration resistances, and locations of the samples and laboratory test data. The stratifications shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual. Water level information obtained during field operations is also shown on these boring logs. The samples that were not altered by laboratory testing will be retained for sixty (60) days from the date of this report and then will be discarded.

Laboratory Testing

Laboratory index testing was conducted on samples obtained during the field drilling operations. The results are listed in Table 2 and Table 3 below.

Table 2
Soil Index Tests

| Boring No. | Sample Depth | Liquid Limit | Plastic Limit | Plasticity Index | Moisture Content |
|------------|--------------|--------------|---------------|------------------|------------------|
| B-12 | 1 to 2-1/2 | 63 | 26 | 37 | 21 |

Table 3
Soil Grain Size Analysis

| Boring No. | Sample Depth | Gravel % | Sand % | Silt and Clay % |
|------------|--------------|----------|--------|-----------------|
| B-01 | 3-1/2 to 5 | 47.6 | 40.4 | 12.1 |
| B-06 | 6 to 7-1/2 | 56.8 | 32.6 | 10.7 |
| B-10 | 3-1/2 to 5 | 58.1 | 32.1 | 9.8 |
| B-12 | 1 to 2-1/2 | 9.4 | 36.3 | 54.3 |
| B-16 | 3-1/2 to 5 | 48.1 | 37.4 | 14.4 |
| B-19 | 3-1/2 to 5 | 66.1 | 22.5 | 11.5 |
| B-20 | 3-1/2 to 5 | 62.7 | 27.8 | 9.5 |

The forgoing tables are summaries of the field and laboratory data. Please refer to the boring logs and laboratory data sheets for specific information found in the appendix of this report.

Percolation Testing

Eight (8) percolation tests (PT-01 thru PT-08) were performed at the site to determine the approximate permeability of in-situ soils. The percolation test was performed within the footprint of the proposed storm water detention area, soil borings B-01 thru B-08, located on the west section of the site. The materials tested in the percolation locations were Clayey Sand with Gravel (SC), Clayey Gravel with Sand (GC), Poorly Graded Sand with Gravel (SP), Poorly Graded Sand with Clay and Gravel (SP-SC), Poorly Graded Gravel with Sand (GP), and Well Graded Gravel with Sand (GW). The test depths were determined using boring sample materials and depth, to depths of approximately 5 to 10 feet. The infiltration rates



range from 0.00435 inches/hour to 170 inches/hour and was determined based on NAVFAC percolation test guidelines according to collected data.

Table 3
Falling Head Permeability Tests

| Location: PT-1 | | | | | | NAVFAC | | USACE, Hvorslev | |
|--|------------|--------|-------|------|------|---------------|----------|------------------------|----------|
| Test Hole Characteristics: 3" ID PVC Pipe, 9' deep | | | | | | | | | |
| Material Characteristic: Brown, Clayey Sand With Gravel | | | | | | | | | |
| Time | ΔH | H_1 | H_2 | R | I | in/hr | cm/sec | in/hr | cm/sec |
| (min) | (in) | (in) | (in) | (in) | (in) | K_v | | K_m | |
| 0.25 | 35.50 | 120.00 | 84.50 | 1.50 | 1.00 | 1.56E+02 | 1.10E-01 | 7.21E+01 | 5.09E-02 |
| 0.75 | 41.50 | 84.50 | 43.00 | 1.50 | 1.00 | 1.00E+02 | 7.08E-02 | 4.63E+01 | 3.27E-02 |

H = top of head to groundwater/bottom of pipe
R = radius
I = length of plug

Infiltration Rate (NAVFAC)

1.28E+02 in/hr

| Location: PT-2 | | | | | | NAVFAC | | USACE, Hvorslev | |
|--|------------|--------|--------|------|-------|---------------|----------|------------------------|----------|
| Test Hole Characteristics: 3" ID PVC Pipe, 8'8" deep | | | | | | | | | |
| Material Characteristic: Brown, Clayey Gravel With Sand | | | | | | | | | |
| Time | ΔH | H_1 | H_2 | R | I | in/hr | cm/sec | in/hr | cm/sec |
| (min) | (in) | (in) | (in) | (in) | (in) | K_v | | K_m | |
| 31.00 | 0.00 | 120.00 | 120.00 | 1.50 | 8.00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 47.00 | 0.00 | 120.00 | 120.00 | 1.50 | 8.00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 34.00 | 0.13 | 120.00 | 119.88 | 1.50 | 8.00 | 1.63E-02 | 1.15E-05 | 1.58E-03 | 1.11E-06 |
| 34.00 | 0.00 | 119.88 | 119.88 | 1.50 | 8.00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 198.00 | 0.75 | 119.88 | 119.13 | 1.50 | 12.00 | 2.45E-02 | 1.73E-05 | 1.63E-03 | 1.15E-06 |

H = top of head to groundwater/bottom of pipe
R = radius
I = length of plug

Infiltration Rate (NAVFAC)

8.15E-03 in/hr

| Location: PT-3 | | | | | | NAVFAC | | USACE, Hvorslev | |
|--|------------|--------|--------|------|-------|---------------|----------|------------------------|----------|
| Test Hole Characteristics: 3" ID PVC Pipe, 9'3.5" deep | | | | | | | | | |
| Material Characteristic: Brown, Clayey Sand With Gravel | | | | | | | | | |
| Time | ΔH | H_1 | H_2 | R | I | in/hr | cm/sec | in/hr | cm/sec |
| (min) | (in) | (in) | (in) | (in) | (in) | K_v | | K_m | |
| 35.00 | 0.00 | 120.00 | 120.00 | 1.50 | 3.00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 54.00 | 0.00 | 120.00 | 120.00 | 1.50 | 3.00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 34.00 | 0.13 | 120.00 | 119.88 | 1.50 | 3.00 | 7.09E-03 | 5.00E-06 | 1.58E-03 | 1.11E-06 |
| 34.00 | 0.00 | 119.88 | 119.88 | 1.50 | 3.00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 186.00 | 0.50 | 119.88 | 119.38 | 1.50 | 10.00 | 1.46E-02 | 1.03E-05 | 1.16E-03 | 8.15E-07 |

H = top of head to groundwater/bottom of pipe
R = radius
I = length of plug

Infiltration Rate (NAVFAC)

4.35E-03 in/hr



Location: PT-4
Test Hole Characteristics: 3" ID PVC Pipe, 4'9" deep
Material Characteristic: Gray, Poorly Graded Gravel With Sand

| Time (min) | ΔH (in) | H_1 (in) | H_2 (in) | R (in) | I (in) | NAVFAC | | USACE, Hvorslev | |
|---------------|--------------------|---------------|---------------|-----------|-----------|----------------|----------|-----------------|----------|
| | | | | | | in/hr K_v | cm/sec | in/hr K_m | cm/sec |
| 3.00 | 7.00 | 120.00 | 113.00 | 1.50 | 2.50 | 4.04E+00 | 2.85E-03 | 1.03E+00 | 7.27E-04 |
| 3.00 | 5.50 | 113.00 | 107.50 | 1.50 | 2.50 | 3.35E+00 | 2.36E-03 | 8.55E-01 | 6.03E-04 |
| 3.00 | 3.50 | 107.50 | 104.00 | 1.50 | 2.50 | 2.22E+00 | 1.57E-03 | 5.67E-01 | 4.00E-04 |
| 3.00 | 6.50 | 104.00 | 97.50 | 1.50 | 2.50 | 4.33E+00 | 3.06E-03 | 1.11E+00 | 7.80E-04 |
| 3.00 | 4.50 | 97.50 | 93.00 | 1.50 | 2.50 | 3.17E+00 | 2.24E-03 | 8.10E-01 | 5.71E-04 |
| 3.00 | 4.00 | 93.00 | 89.00 | 1.50 | 2.50 | 2.95E+00 | 2.08E-03 | 7.53E-01 | 5.32E-04 |
| 3.00 | 6.50 | 89.00 | 82.50 | 1.50 | 2.50 | 5.09E+00 | 3.59E-03 | 1.30E+00 | 9.17E-04 |

H = top of head to groundwater/bottom of pipe
R = radius
I = length of plug

Infiltration Rate (NAVFAC)
3.59E+00 in/hr

Location: PT-5
Test Hole Characteristics: 3" ID PVC Pipe, 7'4" deep
Material Characteristic: Gray, Well Graded Gravel With Sand

| Time (min) | ΔH (in) | H_1 (in) | H_2 (in) | R (in) | I (in) | NAVFAC | | USACE, Hvorslev | |
|---------------|--------------------|---------------|---------------|-----------|-----------|----------------|----------|-----------------|----------|
| | | | | | | in/hr K_v | cm/sec | in/hr K_m | cm/sec |
| 0.17 | 15.00 | 120.00 | 105.00 | 1.50 | 2.00 | 1.37E+02 | 9.67E-02 | 4.11E+01 | 2.90E-02 |
| 0.17 | 16.00 | 105.00 | 89.00 | 1.50 | 2.00 | 1.70E+02 | 1.20E-01 | 5.09E+01 | 3.59E-02 |
| 0.17 | 12.00 | 89.00 | 77.00 | 1.50 | 2.00 | 1.49E+02 | 1.05E-01 | 4.46E+01 | 3.15E-02 |
| 0.17 | 8.00 | 77.00 | 69.00 | 1.50 | 2.00 | 1.13E+02 | 7.94E-02 | 3.38E+01 | 2.38E-02 |
| 0.17 | 10.00 | 69.00 | 59.00 | 1.50 | 2.00 | 1.61E+02 | 1.13E-01 | 4.82E+01 | 3.40E-02 |
| 0.17 | 9.00 | 59.00 | 50.00 | 1.50 | 2.00 | 1.70E+02 | 1.20E-01 | 5.10E+01 | 3.59E-02 |
| 0.17 | 11.00 | 50.00 | 39.00 | 1.50 | 2.00 | 2.55E+02 | 1.80E-01 | 7.65E+01 | 5.40E-02 |
| 0.17 | 7.00 | 39.00 | 32.00 | 1.50 | 2.00 | 2.03E+02 | 1.43E-01 | 6.09E+01 | 4.30E-02 |
| 0.17 | 5.00 | 32.00 | 27.00 | 1.50 | 2.00 | 1.74E+02 | 1.23E-01 | 5.23E+01 | 3.69E-02 |

H = top of head to groundwater/bottom of pipe
R = radius
I = length of plug

Infiltration Rate (NAVFAC)
1.70E+02 in/hr

Location: PT-6
Test Hole Characteristics: 3" ID PVC Pipe, 9'10" deep
Material Characteristic: Brown, Clayey Sand With Gravel

| Time (min) | ΔH (in) | H_1 (in) | H_2 (in) | R (in) | I (in) | NAVFAC | | USACE, Hvorslev | |
|---------------|--------------------|---------------|---------------|-----------|-----------|----------------|----------|-----------------|----------|
| | | | | | | in/hr K_v | cm/sec | in/hr K_m | cm/sec |
| 35.00 | 0.00 | 120.00 | 120.00 | 1.50 | 4.00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 50.00 | 0.50 | 120.00 | 119.50 | 1.50 | 4.00 | 2.43E-02 | 1.72E-05 | 4.29E-03 | 3.03E-06 |
| 50.00 | 0.00 | 119.50 | 119.50 | 1.50 | 4.00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 30.00 | 0.50 | 119.50 | 119.00 | 1.50 | 4.00 | 4.07E-02 | 2.87E-05 | 7.18E-03 | 5.07E-06 |
| 177.00 | 1.25 | 119.00 | 117.75 | 1.50 | 7.00 | 2.81E-02 | 1.98E-05 | 3.07E-03 | 2.16E-06 |

H = top of head to groundwater/bottom of pipe
R = radius
I = length of plug

Infiltration Rate (NAVFAC)
1.86E-02 in/hr



Location: PT-7
Test Hole Characteristics: 3" ID PVC Pipe, 7'4" deep
Material Characteristic: Brown, Poorly Graded Sand With Clay and Gravel

| Time (min) | ΔH (in) | H_1 (in) | H_2 (in) | R (in) | I (in) | NAVFAC | | USACE, Hvorslev | |
|---------------|--------------------|---------------|---------------|-----------|-----------|----------------|----------|-----------------|----------|
| | | | | | | in/hr K_v | cm/sec | in/hr K_m | cm/sec |
| 2.00 | 18.50 | 120.00 | 101.50 | 1.50 | 4.00 | 2.44E+01 | 1.72E-02 | 4.30E+00 | 3.04E-03 |
| 2.00 | 4.50 | 101.50 | 97.00 | 1.50 | 4.00 | 6.61E+00 | 4.66E-03 | 1.17E+00 | 8.22E-04 |
| 2.00 | 12.00 | 97.00 | 85.00 | 1.50 | 4.00 | 1.92E+01 | 1.36E-02 | 3.39E+00 | 2.39E-03 |
| 2.00 | 7.00 | 85.00 | 78.00 | 1.50 | 4.00 | 1.25E+01 | 8.84E-03 | 2.21E+00 | 1.56E-03 |
| 2.00 | 7.00 | 78.00 | 71.00 | 1.50 | 4.00 | 1.37E+01 | 9.67E-03 | 2.42E+00 | 1.71E-03 |
| 2.00 | 6.00 | 71.00 | 65.00 | 1.50 | 4.00 | 1.29E+01 | 9.08E-03 | 2.27E+00 | 1.60E-03 |
| 2.00 | 7.00 | 65.00 | 58.00 | 1.50 | 4.00 | 1.66E+01 | 1.17E-02 | 2.93E+00 | 2.07E-03 |
| 2.00 | 6.00 | 58.00 | 52.00 | 1.50 | 4.00 | 1.59E+01 | 1.12E-02 | 2.81E+00 | 1.98E-03 |
| 2.00 | 5.00 | 52.00 | 47.00 | 1.50 | 4.00 | 1.47E+01 | 1.04E-02 | 2.60E+00 | 1.83E-03 |

H = top of head to groundwater/bottom of pipe
R = radius
I = length of plug

Infiltration Rate (NAVFAC)

1.52E+01 in/hr

Location: PT-8
Test Hole Characteristics: 3" ID PVC Pipe, 6' deep
Material Characteristic: Brown, Poorly Graded Sand With Gravel

| Time (min) | ΔH (in) | H_1 (in) | H_2 (in) | R (in) | I (in) | NAVFAC | | USACE, Hvorslev | |
|---------------|--------------------|---------------|---------------|-----------|-----------|----------------|----------|-----------------|----------|
| | | | | | | in/hr K_v | cm/sec | in/hr K_m | cm/sec |
| 0.17 | 27.00 | 125.00 | 98.00 | 1.50 | 0.00 | 7.49E+01 | 5.29E-02 | 7.49E+01 | 5.29E-02 |
| 0.23 | 40.00 | 98.00 | 58.00 | 1.50 | 0.00 | 1.17E+02 | 8.27E-02 | 1.17E+02 | 8.27E-02 |
| 0.35 | 38.00 | 58.00 | 20.00 | 1.50 | 0.00 | 1.56E+02 | 1.10E-01 | 1.56E+02 | 1.10E-01 |

H = top of head to groundwater/bottom of pipe
R = radius
I = length of plug

Infiltration Rate (NAVFAC)

1.16E+02 in/hr

Groundwater Level Measurements

Groundwater was observed during drilling at borings B-01 thru B-06, and boring B-12 thru B-20 at depths ranging from 8.5 to 13 feet below existing surface grades. Upon completion of drilling, water was observed at boring B-12 at a depth of 8.7 feet below existing surface grades. It must be recognized that free groundwater levels can significantly fluctuate (seasonally) as a function of rainfall. During a time of year or weather different from the time of drilling, there may be a considerable change in the water table or the occurrence of water where not previously encountered. Furthermore, the free groundwater levels in the boreholes often are not representative of the actual groundwater level, because the boreholes remain open for a relatively short time.



GEOTECHNICAL EVALUATION

Geotechnical Discussion

There are three (3) geotechnical-related issues at this site which will affect design and performance of the structure and pavements. The following summarizes these concerns:

- 1. Although not encountered during soil drilling, undocumented fill soils of variable consistency may be encountered during construction and will require remediation. All footings should be placed to bear on native, undisturbed soil or compacted and tested fill material. The Site Preparation section of this report must be followed.**
- 2. High plasticity "Fat" clays were encountered in the exploration that may require remediation depending on their relation to finish grade.**
- 3. A surcharge load or placing fill prior to construction may be required to reduce the settlement risk at this site.**
- 4. If necessary, aeration and drying of some of the wetter on-site natural soils may be required during site grading and compacting operations. Reducing the moisture content of the clay/silt soils may be necessary to achieve proper compaction and establish stable subgrade conditions.**

Undocumented Fill Materials

Undocumented fill introduces a design and construction risk due to the potential for excessive and/or non-uniform settlement. To reduce the settlement risk, PSI recommends that undocumented fill, if encountered, be removed and replaced with compacted and tested structural fill. The in-situ soils can be re-compacted as engineered fill, provided it is free of any organic or other deleterious material. Structural fill should meet the requirements and be prepared as recommended in the *Site Preparation* Section of this Report. Considering construction has occurred on and nearby the site, it is possible that areas of undocumented fill and/or buried construction debris deposits that were not identified by the boring program could be encountered at this site.

High-Plasticity Clay

High plasticity "fat" clays are present in the project area that may expand and shrink thereby impacting the proposed construction. Although Fat Clay soils are not anticipated to be encountered due to the large amount of engineered fill required to bring the site to grade, where these soils are within about two (2) feet of structural features or slabs and one (1) foot of pavements, remediation is recommended. Fat clays have the potential for volume change with changes in the soil moisture content. Remedial measures are recommended if these soils are encountered during foundation excavations to reduce the shrink/swell potential.

Newly-Placed Engineered Fill

It is PSI's understanding that a uniform layer of documented fill will be placed within the area of the building footprint. The amount of fill to be placed is approximately 7 feet in total thickness. Most of the in-situ soils have relatively high blow counts. However, some of the soils in the upper 3 to 6 feet of the site consist of "stiff" clay-based soils with moderately high moisture contents. The anticipated fill will cause the site to settle over a period of time. Therefore, PSI recommends placing the new fill and/or a surcharge on the site for a period of time in order to allow the site to settle within tolerable limits prior to the construction of the proposed structure.



Soil Compaction

Since this site contains some fine-grained clay soils, during periods of wet weather or decreased drying time (such as the spring and fall) it may become difficult to achieve the desired compaction of the soils due to high moisture contents. The soils may need to be scarified and dried to a moisture content that will facilitate compaction in accordance with the structural fill requirements of this report. **Lime, kiln dust, or fly ash stabilization may be necessary to expedite the work and achieve the required level of soil compaction.**

GEOTECHNICAL RECOMMENDATIONS

The following geotechnical related recommendations have been developed based on the subsurface conditions encountered and PSI's understanding of the proposed development. Should changes in the project criteria occur, a review must be made by PSI to determine if modifications to our recommendations will be required.

Site Preparation

Prior to placing concrete floors or engineered fill on this site, general site area clearing should be performed. All existing topsoil, trees, brush, excessively wet soils, highly organic soils, and soft/loose or obviously compressible materials, should be completely removed from the proposed construction areas. Additionally, any undocumented fill materials encountered during site clearing should be removed to a level of suitable soil. If encountered, remnants of former structures (including the foundation system) should also be completely removed. All excavations created during the removal process should be backfilled with compacted and tested structural fill. It is not unusual for surficial material thicknesses to vary from the values observed. The decision regarding the precise extent of required undercutting and backfilling should be determined in the field by a representative of PSI following observation of the exposed subgrades and proof rolling operations.

In this region, otherwise competent clays can undergo a significant loss of stability when construction activities are performed during wetter portions of the year. PSI anticipates that the soils in the project area can become easily disturbed if subjected to conventional rubber tire or narrow track-type equipment. Soils that become disturbed would need to be excavated and replaced; however, this remedial excavation may expose progressively wetter soils with depth, thus compounding the problem condition. Thus, a normal approach to subgrade preparation may not be possible. Appropriate wide-track equipment selection should aid in minimizing potential disturbance.

After stripping to the proposed subgrade level, as outlined above, the building area should be proof-rolled with a loaded tandem axle dump truck or similar heavy rubber-tired vehicle (typically with an axial load greater than nine (9) tons). Soils that are observed to rut or deflect excessively (typically greater than one (1) inch) under the moving load should be undercut and replaced with properly compacted low plasticity fill material. The proof-rolling and undercutting activities should be witnessed by a representative of the geotechnical engineer and should be performed during a period of dry weather. Care should be taken during construction activities not to allow excessive drying or wetting of exposed soils. The subgrade soils should be scarified and compacted to at least 98% of the materials' standard Proctor maximum dry density, in general accordance with ASTM procedures, to a depth of at least twelve (12) inches below the surface. New fill for building structures, asphalt, and concrete should not be placed on frozen ground.



After subgrade preparation and observation have been completed, fill placement required to establish grade may begin. **Low-plasticity structural fill materials placed beneath the structural features or slabs should be free of organic or other deleterious materials and have a maximum particle size of less than three (3) inches. Low-plasticity soils are defined as having a liquid limit less than forty-five (45) and plasticity index below twenty (20). Most of the in-situ soils appear to be suitable for reuse as engineered fill if they are free of any organic material and meet the requirements outlined in this report. Fat Clay soils are not suitable for use as engineered fill.** A representative of PSI should be on-site to observe, test, and document the placement of the fill. If the fill is too dry, water should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. Close moisture content control will be required to achieve the recommended degree of compaction. If wet or cool season earthwork is necessary, PSI recommends the use of imported fill materials meeting the requirements of Ohio Department of Transportation (ODOT) No. 304 aggregate.

Fill should be placed in maximum loose lifts of eight (8) inches and compacted to at least 98% of the materials' standard Proctor maximum dry density, and within a range of the optimum moisture content as designated in the table below, as determined in general accordance with ASTM procedures. Each lift of compacted-engineered fill should be tested and documented by a representative of the geotechnical engineer prior to placement of subsequent lifts. The edges of compacted fill should extend a minimum of five (5) feet beyond the building footprint, or a distance equal to the depth of fill beneath the footings, whichever is greater. The measurement should be taken from the outside edge of the footing to the toe of the excavation prior to sloping.

In utility trenches, shallow foundation excavations, and other areas where large compaction equipment cannot be used, granular engineered fill should be placed as backfill. PSI recommends the use of material meeting Ohio Department of Transportation (ODOT) No. 304, for use as granular engineered fill. Engineered fill should be placed in accordance with the recommendations stated in this section of the report.

The fill placed should be tested and documented by a geotechnical technician and directed by a geotechnical engineer to evaluate the placement of fill material. It should be noted that the geotechnical engineer of record can only certify the testing that is performed, and the work observed by that engineer or staff in direct report to that engineer. The fill should be evaluated in accordance with the following Table:



Table 4
Compaction Requirements

| MATERIAL TESTED | PROCTOR TYPE | MIN % DRY DENSITY | PLACEMENT MOISTURE CONTENT RANGE | FREQUENCY OF TESTING *1 |
|--------------------------------------|---------------------|--------------------------|---|---|
| Structural Lean Clay Fill (Cohesive) | Standard | 98% | -2 to +2 % | 1 per 5,000 ft ² of fill placed / lift |
| Structural Fill (Granular) | Standard | 98% | -2 to +2 % | 1 per 5,000 ft ² of fill placed / lift |
| Random Fill (non-load bearing) | Standard | 90% | -3 to +3 % | 1 per 6,000 ft ² of fill placed / lift |
| Utility Trench Backfill | Standard | 98% | -2 to +2 % | 1 per 150 lineal foot / lift |

*1 Minimum 2 per lift.

Tested fill materials that do not achieve either the required dry density or moisture content range shall be recorded, the location noted, and reported to the Contractor and Owner. A re-test of that area should be performed after the Contractor performs remedial measures and prior to placement of additional fill.

Total Settlement Due to Fill

The majority of the natural soils at this site consisted of dense to very dense, non-cohesive soils. However, some of the soils in the upper 3 to 4 feet of the site consist of “stiff” clay-based soils with moderately high moisture contents. The deepest amount of fill to be placed on the site will be a approximately 7 feet.

Typically, for normal building construction, 1 inch total settlement is the tolerable limit for foundations and ½ inch for floor slabs. PSI understands the plan for the project is to construct the building pad in the Fall 2018 and start foundation construction in Spring 2019. Given this method of construction is followed, there will be no wait period required to allow the site to settle under the weight of the newly-placed engineered fill.

Foundation Recommendations

After implementing the options above, the planned construction for the proposed building can be supported on conventional spread-type footing foundations bearing on properly compacted and documented engineered fill. **Spread footings for building columns and continuous footings for bearing walls can be designed for an allowable soil bearing pressure of 3,000 pounds per square foot (psf) based on the anticipated dead load plus design live load. During footing excavations, a geotechnical engineer should observe the excavation bottoms to determine its consistency with the soils encountered in the soil test borings.** The geotechnical engineer should be allowed to review the documented fill material so as to ensure its consistency with the recommended bearing pressures.

PSI recommends a minimum dimension of thirty (30) inches for square footings and eighteen (18) inches for continuous footings to reduce the potential of a local bearing capacity failure.



Exterior footings and footings in unheated areas should be located at a depth of thirty-two (32) inches or deeper below the final exterior grade to provide adequate frost protection. If the building is to be constructed during the winter months or if footings will likely be subjected to freezing temperatures after foundation construction, then the footings should be protected from freezing. PSI recommends that interior footings be a minimum depth of eighteen (18) inches below the finished floor elevation.

The foundation excavations must be observed and documented by a representative of PSI prior to steel or concrete placement to assess that the foundation materials are consistent with the materials discussed in this report, and therefore can support the design loads. **Soft or loose soil zones encountered at the bottom of the footing excavations, should be removed to the level of suitable natural soils, and replaced with adequately compacted and tested structural fill or lean concrete.** It should be noted that the soft or loose material may be encountered in other areas of the site and to greater depths than observed in the soil test borings. Fill placed below the foundations where unsuitable materials are removed should extend one (1) foot outside the foundation limits for every one (1) foot in thickness between the intended bearing surface and the underlying, suitable natural soils. Alternately, the foundations may be extended through unsuitable soils to bear on the underlying suitable material. Cavities formed because of excavation of soft or loose soil zones should be backfilled with lean concrete or dense graded compacted crushed stone.

After opening, footing excavations should be observed, and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond in or adjacent to the excavation. If possible, the foundation concrete should be placed during the same day the excavation is made. If it is required that footing excavations be left open for more than one day, they should be protected to reduce evaporation or entry of moisture.

Based on the known subsurface conditions and site geology, laboratory testing and past experience, PSI anticipates that properly designed and constructed footings supported on the recommended materials should experience total and differential settlement between adjacent columns of less than one (1) inch and ½ inch, respectively.

Be advised that as a part of the foundation selection process, there is a cost/benefit evaluation. Although PSI is recommending a specific foundation type, we have not accomplished the cost/benefit evaluation.

Earthquake and Seismic Design Consideration

The 2009 International Building Code requires a site class for the calculation of earthquake design forces. This class is a function of soil type (i.e., depth of soil and strata types). The average shear wave velocity in the geophysical survey defined the site as a **Site Class “D”**. The USGS-NEHRP probabilistic ground motion values near latitude 40.0600° and longitude -84.2145° are as follows:

| Period (seconds) | 2% Probability of Event in 50 years * (%g) | Site Coefficients | Max. Spectral Acceleration Parameters | Design Spectral Acceleration Parameters | |
|-----------------------|--|----------------------|---------------------------------------|---|------------------------|
| 0.2 (S _s) | 22.4 | F _a = 1.6 | S _{ms} = 0.358 | S _{Ds} = 0.239 | T ₀ = 0.093 |
| 1.0 (S ₁) | 6.9 | F _v = 2.4 | S _{m1} = 0.166 | S _{D1} = 0.111 | T _s = 0.464 |



The Site Coefficients, F_a and F_v were interpolated from IBC 2009 Tables 1613.5.3(1) and 1613.5.3(2) as a function of the site classifications and the mapped spectral response acceleration at the short (S_s) and 1 second (S_1) periods.

Floor Slab Recommendations

Once the site area has been prepared in accordance with the "Site Preparation" section of this report, the floor slab can be grade supported on properly compacted structural fill. Preparation of floor slab subgrades should be in accordance with recommendations outlined in the *Site Preparation* section of this report. Proof-rolling, as discussed earlier in this report, should be accomplished to identify soft or unstable soils that should be removed from the floor slab area prior to fill placement and/or floor slab construction. These soils should be replaced with properly compacted and tested structural fill as described earlier in this report.

PSI recommends that a minimum four (4) inch thick trimmable, compactable granular material be placed beneath the floor slab to enhance drainage. The soil surface shall be graded to drain away from the building without low spots that can trap water prior to placing the granular drainage layer. Polyethylene sheeting should be placed to act as a vapor retarder where the floor will be in contact with moisture sensitive equipment or products such as tile, wood, carpet, etc., as directed by the design engineer. The decision to locate the vapor retarder in direct contact with the slab or beneath the layer of granular fill should be made by the design engineer after considering the moisture sensitivity of subsequent floor finishes, anticipated project conditions, and the potential effects of slab curling and cracking. The floor slabs should have an adequate number of joints to reduce cracking resulting from differential movement and shrinkage.

For subgrade prepared as recommended and properly compacted fill, a modulus of subgrade reaction, k value, of **130 pounds per cubic inch (pci)** may be used in the grade slab design based on correlation to values typically resulting from a 1 ft. x 1 ft. plate load test. However, depending on how the slab load is applied, the value will have to be geometrically modified. The value should be adjusted for larger areas using the following expression for cohesive and cohesionless soil:

Modulus of Subgrade Reaction, $k_s = \left(\frac{k}{B} \right)$ for cohesive soil and

$$k_s = k \left(\frac{B+1}{2B} \right)^2 \text{ for cohesionless soil}$$

where: k_s = coefficient of vertical subgrade reaction for loaded area,
 k = coefficient of vertical subgrade reaction for 1 square foot area, and
 B = effective width of area loaded, in feet

The precautions listed below should be followed for construction of slab-on-grade pads. These details will not reduce the amount of movement but are intended to reduce potential damage should some settlement of the supporting subgrade take place. Some increase in moisture content is inevitable because of development and associated landscaping. However, extreme moisture content increases can be largely controlled by proper and responsible site drainage, building maintenance and irrigation practices.

- Cracking of slab-on-grade concrete is normal and should be expected. Cracking can occur not only because of heaving or compression of the supporting soil and/or bedrock material, but also because of concrete curing stresses. The occurrence of concrete shrinkage crack, and problems associated with



concrete curing may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement, finishing, and curing, and by the placement of crack control joints at frequent intervals, particularly where re-entrant slab corners occur. The American Concrete Institute (ACI) recommends a maximum panel size (in feet) equal to approximately three times the thickness of the slab (in inches) in both directions. For example, joints are recommended at a maximum spacing of twelve (12) feet based on having a four-inch slab. PSI also recommends that the slab be independent of the foundation walls. Using fiber reinforcement in the concrete can also control shrinkage cracking.

- Areas supporting slabs should be properly moisture conditioned and compacted. Backfill in all interior and exterior water and sewer line trenches should be carefully compacted to reduce the shear stress in the concrete extending over these areas.

Exterior slabs should be isolated from the building. These slabs should be reinforced to function as independent units. Movement of these slabs should not be transmitted to the building foundation or superstructure.

Utilities Trenching

Excavation for utility trenches shall be performed in accordance with OSHA regulations as stated in 29 CFR Part 1926. It should be noted that utility trench excavations have the potential to degrade the properties of the adjacent fill materials. Utility trench walls that can move laterally can lead to reduced bearing capacity and increased settlement of adjacent structural elements and overlying slabs.

Backfill for utility trenches is as important as the original subgrade preparation or structural fill placed to support either a foundation or slab. Therefore, it is imperative that the backfill for utility trenches be placed to meet the project specifications for the structural fill of this project. PSI recommends that flowable fill or lean mix concrete be utilized for utility trench backfill. If on-site soils are placed as trench backfill, the backfill for the utility trenches should be placed in four (4) to six (6) inch loose lifts and compacted to a minimum of 98% of the maximum dry density achieved by the standard Proctor test. The backfill soil should be moisture conditioned to be within 2% of the optimum moisture content as determined by the standard Proctor test. Up to four (4) inches of bedding material placed directly under the pipes or conduits placed in the utility trench can be compacted to the 98% compaction criteria with respect to the standard Proctor. Compaction testing should be performed for every 200 cubic yards of backfill place or each lift within 150 linear feet of trench, whichever is less. Backfill of utility trenches should not be performed with water standing in the trench. If granular material is used for the backfill of the utility trench, the granular material should have a gradation that will filter protect the backfill material from the adjacent soils. If this gradation is not available, a geosynthetic non-woven filter fabric should be used to reduce the potential for the migration of fines into the backfill material. Granular backfill material shall be compacted to meet the above compaction criteria. The clean granular backfill material should be compacted to achieve a relative density greater than 75% or as specified by the geotechnical engineer for the specific material used.

Siltation Control

The Clean Water Act implemented in 1990 includes a federal permit program called the National Pollutant Discharge Elimination System (NPDES). This program requires that projects sites in excess of one (1) acre or are part of a development which exceeds one (1) acre be covered under a permit. This typically includes the development of a storm water pollution prevention plan (SWPPP) as well as period inspections (typically once a week plus after significant rainfall). PSI is available to assist with these services.



Pavement Recommendations

PSI’s scope of services did not include extensive sampling and CBR testing of existing subgrade or potential sources of imported fill for the specific purpose of detailed pavement analysis. Instead, this report is based on pavement-related design parameters that are considered to be typical for the area soils types. In large areas of pavement, or where pavements are subject to significant traffic, a more detailed analysis of the subgrade and traffic conditions should be made. The results of such a study will provide information necessary to design an economical and serviceable pavement.

No traffic information was available for the proposed development. However, the pavement design is based on the anticipated design 18-kip ESAL’s of 50,000 and 100,000 for Flexible Standard Duty Pavement areas and Heavy-Duty Pavement areas, respectively, and an anticipated design life is 20 years. The PSI recommendation is based on the subgrade soils being prepared to achieve a minimum CBR of four (4). On this basis, it is possible to use a locally typical "standard" pavement section consisting of the following:

| RECOMMENDED THICKNESSES (INCHES) | | |
|----------------------------------|-------------|-----------|
| PAVEMENT MATERIALS * | CAR PARKING | DRIVEWAYS |
| Asphaltic Surface Course | 1½ | 1½ |
| Asphaltic Binder Course | 2 | 2½ |
| Crushed stone (¾-inch minus) | 6 | 8 |
| Or | | |
| Portland Cement Concrete | 5 | 6 |
| Crushed stone (¾-inch minus) | 6 | 6 |

*Pavement materials should conform to local and state guidelines, if applicable.

Asphalt Pavement

PSI recommends that the bituminous concrete mix meet the general guidelines as outlined in ODOT Item 448 for the base and surface courses. The granular base course should be built at least 2 feet wider than the pavement on each side to support the tracks of the slipform paver. This extra width is structurally beneficial for wheel loads applied at pavement edge. The asphalt surface and binder course should be compacted to a minimum of 92% of the Maximum Theoretical Density as determined by ASTM D2041.

Concrete Pavement

Because the pavement at this site will be subjected to freeze-thaw cycles, PSI recommends that an air entrainment admixture be added to the concrete mix to achieve an air content in the range of 5% to 7% to provide freeze-thaw durability in the concrete. Concrete with a minimum 28 day specified compressive strength of 4,000 psi should be used. The mixture should have a maximum slump of four (4) inches. If a water reducing admixture is used in the mix design, then the slump can be increased. It is recommended that a concrete mix design including any admixtures be submitted to the owner in advance of use at the project site.



Pavement for any dumpster areas or areas subject to consistent heavy loads should be constructed of Portland cement concrete with load transfer devices installed where construction joints are required. A thickened edge is recommended on the outside of slabs subjected to wheel loads. This thickened edge usually takes the form of an integral curb. Fill material should be compacted behind the curb or the edge of the outside slabs should be thickened. The following are recommended to enhance the quality of the pavement.

- Moisten subgrade just prior to placement of concrete
- Cure fresh concrete with a liquid membrane-forming curing compound
- Keep automobile traffic off the slab for three (3) days and truck traffic off the slab for seven (7) days, unless tests are made to determine that the concrete has gained adequate strength (i.e., usually 70% of design strength)

Pavement Subgrade Preparation

Pavement design will include proper preparation of subgrade sectors, careful design of the pavement area drainage systems and utilization of an aggregate base course with asphalt concrete or concrete surface course. Preparation of pavement subgrades should be in accordance with recommendations outlined in the *Site Preparation* sections of this report. Engineered fill should be compacted to a minimum 98 percent of maximum dry density and within +/- 2 percent of optimum moisture in accordance with ASTM D-698 (Standard) in the top 12 inches of subgrade and then proof-rolled using a loaded tandem axle dump truck or similar type of pneumatic tired equipment with a minimum gross weight of nine (9) tons per single axle. Localized soft areas identified should be repaired prior to paving. Moisture content of the subgrade should be maintained between -2% and +2% of the optimum at the time of paving. It may require rework when the subgrade is either desiccated or wet.

Construction traffic should be minimized to prevent unnecessary disturbance of the pavement subgrade. Disturbed areas, as verified by PSI, should be removed and replaced with properly compacted material.

The edges of compacted fill should extend a minimum two (2) feet beyond the edges of the pavement, or a distance equal to the depth of fill beneath the pavement, whichever is greater. The measurement should be taken from the outside edge of the pavement to the toe of the excavation prior to sloping.

Pavement Drainage & Maintenance

PSI recommends pavements be sloped to provide rapid surface drainage. Water allowed to pond on or adjacent to the pavement could saturate the subgrade and cause premature deterioration of the pavements, and removal and replacement may be required. **It must be emphasized that if water can pond beneath the pavement, then freeze-thaw cycles will cause subsequent heaving of the pavement section (and ultimately failure).** Consideration should be given to the use of interceptor drains to collect and remove water collecting in the granular base. The interceptor drains could be incorporated with the storm drains of other utilities located in the pavement areas.

Periodic maintenance of the pavement should be anticipated. This should include sealing of cracks and joints and by maintaining proper surface drainage to avoid ponding of water on or near the pavement areas. Underdrains, sub-drains and underslab drains presented in this report will not prevent moisture vapor that can cause mold growth.



CONSTRUCTION CONSIDERATIONS

PSI should be retained to provide observation and testing of construction activities involved in the foundation, earthwork, and related activities of this project. PSI cannot accept responsibility for conditions that deviate from those described in this report, nor for the performance of the foundation system if not engaged to also provide construction observation and testing for this project.

Moisture Sensitive Soils/Weather Related Concerns

The upper fine-grained soils encountered at this site will be sensitive to disturbances caused by construction traffic and to changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

Drainage and Groundwater Considerations

PSI recommends that the Contractor determine the actual groundwater levels at the site at the time of the construction activities to assess the impact groundwater may have on construction. Water should not be allowed to collect in the foundation excavation, on floor slab areas, or on prepared subgrades of the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of collected rainwater, groundwater, or surface runoff.

Positive site drainage should be provided to reduce infiltration of surface water around the perimeter of the building and beneath the floor slabs. The grades should be sloped away from the building and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and floor slab areas of the building.

Excavations

In Federal Register, Volume 54, Number 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better enhance the safety of workers entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the new OSHA guidelines. It is PSI's understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

PSI is providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations. A trench safety plan was beyond the scope of our services on this project.



GEOTECHNICAL RISK

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding section constitutes PSI's professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and PSI's experience in working with these conditions.

REPORT LIMITATIONS

The recommendations submitted are based on the available subsurface information obtained by PSI and design details furnished by Carter & Cline. If there are revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the foundation recommendations are required. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the project.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete, the geotechnical engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of Board of Recovery & Mental Health Services for the specific application to the proposed Tri-County Health Development to be located at County Road 25A in Troy, Miami County, Ohio.



Appendix





**FREYTAG
ARCHITECTS**
2204 LINDSEY AVE
TROY, OHIO 45366

**NEW BUILDING
TRI-COUNTY HEALTH**
ROUTE 25-A
Piquette, OHIO

These drawings and/or reports represent the design of the project as shown. They are not to be used for construction or other purposes without the express written consent of the architect. The architect is not responsible for the accuracy of the information provided by others. The architect is not responsible for the accuracy of the information provided by others. The architect is not responsible for the accuracy of the information provided by others.

REVISIONS:

| NO. | DATE | DESCRIPTION |
|-----|----------|-------------------|
| 1 | 10/15/15 | ISSUED FOR PERMIT |
| 2 | 10/15/15 | ISSUED FOR PERMIT |

Bidders are responsible to review Scope of Work in the Project Manual. In order to comply, Bidders are responsible to review all CONTRACT DOCUMENTS.

SOIL BORING PLAN
SB1.0

⊕ - Indicates Approximate Soil Test Boring Location



Boring Location Plan
Tri-County Health Development
North County Road 25A
Troy, Miami County, Ohio

Drawing Provided By: Carter and Cline

Project No.: 01051337

Date: 10/15/2018



Google Earth

© 2018 Google



Permeability Test Location Plan
Tri-County Health Development
North County Road 25A
Troy, Miami County, Ohio

Drawing Provided By: Carter and Cline

Project No.: 01051337

Date: 10/04/2018

DATE STARTED: 9/19/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/19/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 15.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0604° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2164° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-01

Water
 ∇ While Drilling 11.5 feet
 ▼ Upon Completion N/A feet
 ▼ Cave Depth 6 feet

BORING LOCATION:
 See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft @ | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|---|---------------------|---------------------------|--|---|--------------------|
| | | | | | | | | | X Moisture □ PL + LL ▲ Qu * Qp | | |
| 0 | | | | | | TOPSOIL (3") Brown, SILTY CLAY , (Driller's Description) | TOPSOIL CL-ML | | | | |
| | 1 | | | | 18 | Very Stiff, Moist, Brown, SANDY FAT CLAY WITH GRAVEL | CH | 3-3-6 $N_{60}=13$ | 29 | | |
| | 2 | | | | 18 | Dense, Moist, Brown, CLAYEY GRAVEL WITH SAND | GC | 10-15-18 $N_{60}=47$ | 4 | | Fines=12.1% |
| 5 | | | | | | ▼ Dense, Moist, Brown, WELL GRADED SAND WITH CLAY AND GRAVEL | SW-SC | 10-9-18 $N_{60}=38$ | 4 | | |
| | 3 | | | | 18 | | | | | | |
| | 4 | | | | 18 | Extremely Dense, Wet, Brown, CLAYEY SAND WITH GRAVEL | SC | 39-33-28 $N_{60}=86$ | 9 | | >>⊕ |
| 10 | | | | | | ▼ Extremely Dense, Moist, Brown, LIMESTONE COBBLE | LIMESTONE | | | | >>⊕ |
| | 5 | | | | 1 | | | 50/6 | | | |
| 15 | | | | | | Boring terminated due to refusal, 14' | | | | | |



Professional Service Industries, Inc.
 5599 Webster Street
 Dayton, OH 45414
 Telephone: (937) 898-1200

PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/19/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/19/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 15.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0599° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2164° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-02

| | | |
|--------------|-------------------|----------|
| Water | ▽ While Drilling | 8.5 feet |
| | ▼ Upon Completion | N/A feet |
| | ▽ Cave Depth | 6.5 feet |

BORING LOCATION:
See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft @ | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|---|---------------------|---------------------------|-------------|---|--------------------|
| 0 | | | | | | TOPSOIL (3.5") Brown, SILTY CLAY , (Driller's Description) Stiff, Moist, Brown, SANDY LEAN CLAY | TOPSOIL CL-ML | | | | |
| | 1 | | | 1 | 18 | | CL | 3-4-3 $N_{60}=10$ | 23 | ⊙ × * | |
| | 5 | | | 2 | 18 | Medium Dense, Moist, Brown, WELL GRADED SAND WITH CLAY AND GRAVEL | SW-SC | 8-6-10 $N_{60}=23$ | 7 | × ⊙ | |
| | 8 | | | 3 | 18 | ▼ Dense to Extremely Dense, Moist to Wet, Brown, CLAYEY GRAVEL WITH SAND | | 9-9-12 $N_{60}=30$ | 8 | × ⊙ | |
| | 11 | | | 4 | 11 | ▽ | GC | 10-50/5 | 13 | × ⊙ >> | |
| | 15 | | | 5 | 18 | Dense, Wet, Brown, CLAYEY SAND WITH GRAVEL | SC | 16-16-14 $N_{60}=42$ | 12 | × ⊙ | |
| | | | | | | End of boring, 15' | | | | | |



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 Telephone: (937) 898-1200

PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/19/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/19/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 15.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0595° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2164° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS
REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

BORING B-03

| | | |
|--------------|-------------------|----------|
| Water | ▽ While Drilling | 8.5 feet |
| | ▼ Upon Completion | N/A feet |
| | ▽ Cave Depth | 5 feet |

BORING LOCATION:
See boring location plan

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft @ | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|--|---------------------|---------------------------|-------------|---|--------------------|
| 0 | 0 | | | | | TOPSOIL (3.5") Brown, SILTY CLAY , (Driller's Description) Stiff, Moist, Brown, FAT CLAY WITH SAND | TOPSOIL CL-ML | | | | |
| | 1 | | | 1 | 0 | | CH | 3-3-7 $N_{60}=14$ | 26 | ⊗ | |
| | 5 | | | 2 | 16 | Dense, Moist, Gray, POORLY GRADED SAND WITH GRAVEL | SP | 17-15-11 $N_{60}=37$ | 4 | ⊗ | |
| | 3 | | | 3 | 18 | Dense, Moist to Wet, Brown, CLAYEY SAND WITH GRAVEL | | 9-10-11 $N_{60}=30$ | 10 | ⊗ | |
| | 4 | | | 4 | 18 | | SC | 13-27-20 $N_{60}=66$ | 10 | ⊗ | >>⊗ |
| | 5 | | | 5 | 16 | Very Dense, Wet, Brown, CLAYEY GRAVEL WITH SAND | GC | 21-20-23 $N_{60}=61$ | 10 | ⊗ | >>⊗ |
| | 15 | | | | | End of boring, 15' | | | | | |



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 Dayton, OH 45414
 Telephone: (937) 898-1200

PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/19/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/19/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 15.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0604° **HAMMER TYPE:** Automatic
LONGITUDE: -84.216° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-04

| | | |
|--------------|-------------------|----------|
| Water | ▽ While Drilling | 8.5 feet |
| | ▼ Upon Completion | N/A feet |
| | ▽ Cave Depth | 5.5 feet |

BORING LOCATION:
See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STRENGTH, tsf | Additional Remarks | |
|------------------|--------------|--|-------------|------------|-------------------|----------------------|---------------------|---------------------------|-------------|---------------|--------------------|--|
| 0 | | TOPSOIL (3.5") Brown, SILTY CLAY , (Driller's Description) | | | | TOPSOIL CL-ML | | | | | | |
| | 1 | Very Stiff, Moist, Brown, SANDY LEAN CLAY | | 1 | 10 | | CL | 3-4-7 $N_{60}=16$ | 15 | | | |
| | 2 | Very Dense, Moist, Gray, POORLY GRADED GRAVEL WITH SAND | | 2 | 18 | | GP | 43-22-25 $N_{60}=66$ | 4 | × | >>⊕ | |
| | 3 | Extremely Dense, Moist, Gray, POORLY GRADED SAND WITH GRAVEL | | 3 | 10 | | SP | 40-50/6 | 4 | × | >>⊕ | |
| | 4 | Very Dense to Dense, Wet, Brown, CLAYEY GRAVEL WITH SAND | | 4 | 18 | | GC | 16-22-24 $N_{60}=65$ | 7 | × | >>⊕ | |
| | 5 | | | 5 | | | | 11-19-12 $N_{60}=44$ | 13 | × | ⊕ | |
| | 15 | End of boring, 15' | | | | | | | | | | |



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PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/19/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/19/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 15.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.06° **HAMMER TYPE:** Automatic
LONGITUDE: -84.216° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-05

| | | |
|--------------|-------------------|----------|
| Water | ▽ While Drilling | 8.5 feet |
| | ▼ Upon Completion | N/A feet |
| | ▽ Cave Depth | 6 feet |

BORING LOCATION:
See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft @ | | Additional Remarks |
|------------------|--------------|---|-------------|------------|-------------------|----------------------|---------------------|---------------------------|-------------|---|-------------|--------------------|
| | | | | | | | | | | X Moisture ▣ PL ▣ LL | | |
| | | | | | | | | | | STRENGTH, tsf ▲ Qu * Qp | | |
| 0 | | TOPSOIL (5.5") | | | | TOPSOIL | | | | | | |
| | | Brown, SILTY CLAY , (Driller's Description) | | | | CL-ML | | | | | | |
| | | Very Stiff, Moist, Brown, GRAVELLY FAT CLAY | | 1 | 18 | | CH | 3-5-20 $N_{60}=35$ | 22 | X | * (circled) | |
| | | Very Dense, Moist, Gray, POORLY GRADED GRAVEL WITH SAND | | 2 | 18 | | GP | 12-17-20 $N_{60}=52$ | 6 | X | | >> (circled) |
| 5 | | Extremely Dense, Moist, Gray, WELL GRADED SAND WITH GRAVEL | | 3 | 18 | | SW | 26-29-38 $N_{60}=95$ | 4 | X | | >> (circled) |
| | | Dense, Wet, Brown, CLAYEY SAND WITH GRAVEL | | 4 | 18 | | SC | 17-14-19 $N_{60}=47$ | 11 | X | | (circled) |
| 10 | | Very Dense, Wet, Brown, CLAYEY GRAVEL WITH SAND | | 5 | 16 | | GC | 20-19-30 $N_{60}=69$ | 10 | X | | >> (circled) |
| 15 | | End of boring, 15' | | | | | | | | | | |



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 Telephone: (937) 898-1200

PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/19/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/19/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 15.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0595° **HAMMER TYPE:** Automatic
LONGITUDE: -84.216° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-06

| | | |
|--------------|-------------------|----------|
| Water | ▽ While Drilling | 9.5 feet |
| | ▼ Upon Completion | N/A feet |
| | ▽ Cave Depth | 6.5 feet |

BORING LOCATION:
See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft @ | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|--|---------------------|---------------------------|-------------|---|--------------------|
| | | | | | | | | | | X Moisture ◻ PL ◻ LL ▲ Qu * Qp | |
| 0 | | | | | | TOPSOIL (3.5") Brown, SILTY CLAY , (Driller's Description) Stiff, Moist, Brown, SANDY FAT CLAY | TOPSOIL CL-ML | | | | |
| | 1 | | | 1 | 18 | | CH | 2-3-6 $N_{60}=13$ | 20 | | |
| | 2 | | | 2 | 0 | Dense, Moist, Brown, CLAYEY GRAVEL | GC | 11-11-16 $N_{60}=38$ | 6 | | |
| | 5 | | | 3 | 18 | Extremely Dense, Moist, Brown, POORLY GRADED GRAVEL WITH CLAY AND SAND | GP-GC | 20-33-36 $N_{60}=97$ | 5 | | >> Fines=10.7% |
| | 10 | | | 4 | 18 | Dense, Wet, Brown, CLAYEY SAND WITH GRAVEL | SC | 15-15-19 $N_{60}=48$ | 10 | | |
| | 15 | | | 5 | 15 | Dense, Wet, Brown, CLAYEY GRAVEL WITH SAND | GC | 16-21-13 $N_{60}=48$ | 13 | | |
| | | | | | | End of boring, 15' | | | | | |



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 Telephone: (937) 898-1200

PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/19/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/19/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 5.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0604° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2155° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-07

Water
 ∇ While Drilling N/A feet
 ▼ Upon Completion N/A feet
 ∇ Cave Depth N/A feet

BORING LOCATION:
 See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft @ | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|--|---------------------|---------------------------|-------------|---|--------------------|
| 0 | | | | | | TOPSOIL (3") Brown, SILTY CLAY , (Driller's Description) | TOPSOIL CL-ML | | | X Moisture □ PL + LL | |
| | | | | 1 | 18 | Stiff, Moist, Brown, LEAN CLAY WITH SAND , Organics | CL | 3-4-4 $N_{60}=11$ | 19 | X Qu * Qp | |
| | | | | 2 | 5 | Medium Dense, Moist, Brown, POORLY GRADED SAND WITH CLAY AND GRAVEL | SP-SC | 6-3-4 $N_{60}=10$ | 6 | | |
| 5 | | | | | | End of boring, 5' | | | | | |



Professional Service Industries, Inc.
 5599 Webster Street
 Dayton, OH 45414
 Telephone: (937) 898-1200

PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/19/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/19/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 5.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0595° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2155° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-08

| | | |
|--------------|-------------------|----------|
| Water | ▽ While Drilling | N/A feet |
| | ▼ Upon Completion | N/A feet |
| | ▽ Cave Depth | 3 feet |

BORING LOCATION:
See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft @ | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|--|---------------------|---------------------------|-------------|--|--------------------|
| 0 | | | | | | TOPSOIL (4") Brown, SILTY CLAY , (Driller's Description) | TOPSOIL CL-ML | | | | |
| | | | | 1 | 10 | Medium Dense, Moist, Brown, CLAYEY SAND WITH GRAVEL | SC | 3-5-7 $N_{60}=17$ | 19 | X Moisture PL LL 0 25 50 | |
| | | | | 2 | 18 | Dense, Moist, Brown, POORLY GRADED SAND WITH GRAVEL | SP | 15-13-13 $N_{60}=37$ | 6 | STRENGTH, tsf ▲ Qu * Qp 0 2.0 4.0 | >>* |
| 5 | | | | | | End of boring, 5' | | | | | |



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 Dayton, OH 45414
 Telephone: (937) 898-1200

PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/18/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/18/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 5.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0595° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2147° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-09

| | | |
|--------------|-------------------|----------|
| Water | ▽ While Drilling | N/A feet |
| | ▼ Upon Completion | N/A feet |
| | ▽ Cave Depth | 3 feet |

BORING LOCATION:
See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft © | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|--|---------------------|---------------------------|-------------|---|--------------------|
| 0 | | | | | | TOPSOIL (4") Brown, SILTY CLAY , (Driller's Description) | TOPSOIL CL-ML | | | | |
| | | | | 1 | 16 | Very Stiff, Moist, Brown, SANDY LEAN CLAY , Organics | CL | 5-4-7 $N_{60}=16$ | 18 | ⊗ | * |
| | | | | 2 | 18 | Very Dense, Moist, Gray, WELL GRADED GRAVEL WITH SAND | GW | 19-25-23 $N_{60}=68$ | 5 | × | >>⊕ |
| 5 | | | | | | End of boring, 5' | | | | | |



Professional Service Industries, Inc.
 5599 Webster Street
 Dayton, OH 45414
 Telephone: (937) 898-1200

PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/18/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/18/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 5.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0605° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2142° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-10

Water
 ∇ While Drilling N/A feet
 ▼ Upon Completion N/A feet
 ▽ Cave Depth 3 feet

BORING LOCATION:
 See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft @ | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|--|---------------------|---------------------------|-------------|---|--------------------|
| 0 | | | | | | TOPSOIL (5") Brown, SILTY CLAY , (Driller's Description) | TOPSOIL CL-ML | | | | |
| | | | | 1 | 18 | Very Stiff, Moist, Brown, SANDY FAT CLAY | CH | 2-6-4 $N_{60}=14$ | 22 | X Moisture ◻ PL ◼ LL | |
| | | | | 2 | 16 | Dense, Moist, Gray, WELL GRADED GRAVEL WITH CLAY AND SAND | GW-GC | 10-15-20 $N_{60}=49$ | 5 | ▲ Qu * Qp | ⊙ Fines=9.8% |
| 5 | | | | | | End of boring, 5' | | | | | |



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PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/18/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/18/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 5.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0596° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2141° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-11

| | | |
|--------------|-------------------|----------|
| Water | ▽ While Drilling | N/A feet |
| | ▼ Upon Completion | N/A feet |
| | ▽ Cave Depth | 2.7 feet |

BORING LOCATION:
See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft © | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|---|---------------------|---------------------------|-------------|---|--------------------|
| 0 | | | | | | TOPSOIL (4") Brown, SILTY CLAY , (Driller's Description) | TOPSOIL CL-ML | | | | |
| | | | | 1 | 18 | Very Stiff, Moist, Brown, SANDY LEAN CLAY | CL | 3-4-10 $N_{60}=20$ | 22 | ⊗ | >>* |
| | | | | 2 | 18 | Very Dense, Moist, Gray, WELL GRADED SAND WITH CLAY AND GRAVEL | SW-SC | 16-20-23 $N_{60}=61$ | 6 | × | >>⊕ |
| 5 | | | | | | End of boring, 5' | | | | | |



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PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

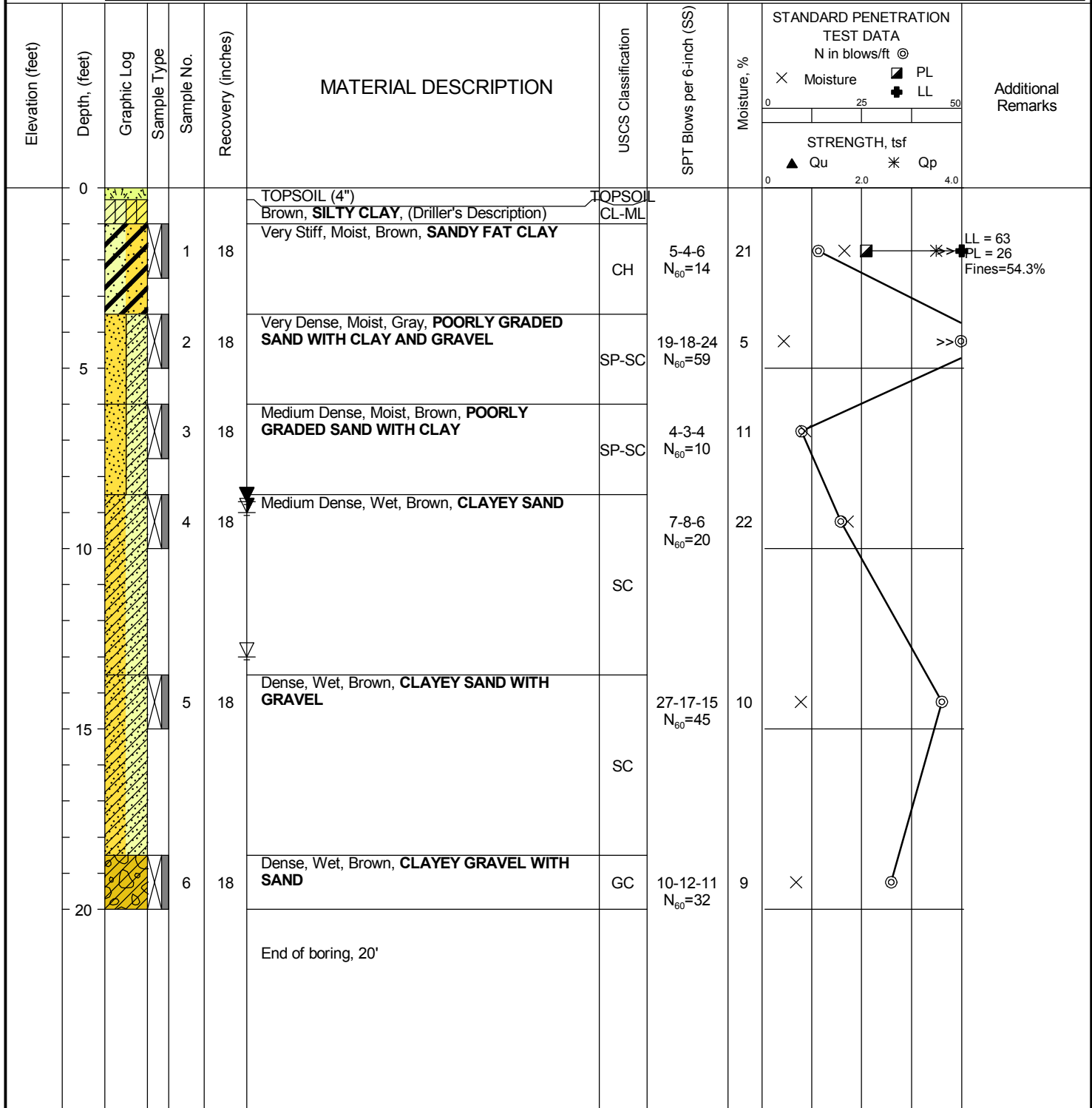
DATE STARTED: 9/19/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/19/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 20.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0602° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2153° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-12

| | | |
|--------------|-------------------|----------|
| Water | ▽ While Drilling | 13 feet |
| | ▼ Upon Completion | 8.7 feet |
| | ▽ Cave Depth | 9 feet |

BORING LOCATION:
 See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.



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PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/19/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/19/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 15.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.06° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2152° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-13

Water
 ∇ While Drilling 9 feet
 ▼ Upon Completion N/A feet
 ▽ Cave Depth 8.5 feet

BORING LOCATION:
 See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA | | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|---|---------------------|---------------------------|-------------|--------------------------------|-----|--------------------|
| | | | | | | | | | | N in blows/ft @ | | |
| 0 | | | | | | TOPSOIL (4") Brown, SILTY CLAY , (Driller's Description) | TOPSOIL CL-ML | | | | | |
| | 1 | | | 1 | 18 | Very Stiff, Moist, Brown, LEAN CLAY WITH SAND | CL | 4-4-5 $N_{60}=13$ | 19 | × | * | |
| | 2 | | | 2 | 18 | Dense, Moist, Brown, POORLY GRADED SAND WITH CLAY AND GRAVEL | SP-SC | 11-10-13 $N_{60}=32$ | 6 | × | ⊙ | |
| | 3 | | | 3 | 18 | Very Dense, Moist, Gray, WELL GRADED GRAVEL WITH CLAY AND SAND | GW-GC | 19-21-16 $N_{60}=52$ | 5 | × | >>⊙ | |
| | 4 | | | 4 | 18 | Medium Dense, Wet, Brown, POORLY GRADED SAND WITH CLAY | SP-SC | 8-7-11 $N_{60}=25$ | 16 | × | ⊙ | |
| | 5 | | | 5 | 18 | Very Stiff, Wet, Brown and Gray, SILT | ML | 3-6-10 $N_{60}=23$ | 17 | × | ⊙ | |
| | 15 | | | | | End of boring, 15' | | | | | | |



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PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/19/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/19/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 20.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0597° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2152° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-14

Water
 ∇ While Drilling 11 feet
 ▼ Upon Completion N/A feet
 ▽ Cave Depth 4 feet

BORING LOCATION:
 See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA | | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|--|---------------------|---------------------------|-------------|--------------------------------|---------------|--------------------|
| | | | | | | | | | | N in blows/ft ⊙ | Strength, tsf | |
| 0 | | | | | | TOPSOIL (4.5") Brown, SILTY CLAY , (Driller's Description) | TOPSOIL CL-ML | | | | | |
| | 1 | | | | 18 | Stiff, Moist, Brown, SANDY LEAN CLAY , Organics | CL | 2-4-3 $N_{60}=10$ | 16 | ⊙ | * | |
| | 2 | | | | 18 | Very Dense, Moist, Gray, POORLY GRADED GRAVEL WITH CLAY AND SAND | GP-GC | 17-19-23 $N_{60}=59$ | 7 | × | >>⊙ | |
| | 3 | | | | 7 | Dense, Moist, Gray, WELL GRADED SAND WITH CLAY AND GRAVEL | SW-SC | 25-14-14 $N_{60}=40$ | 5 | × | ⊙ | |
| | 4 | | | | 18 | Medium Dense, Moist, Brown, POORLY GRADED SAND WITH CLAY AND GRAVEL | SP-SC | 13-9-6 $N_{60}=21$ | 6 | × | ⊙ | |
| | 5 | | | | 18 | Medium Dense, Wet, Brown, POORLY GRADED SAND WITH CLAY | SP-SC | 6-6-10 $N_{60}=23$ | 17 | × | ⊙ | |
| | 6 | | | | 18 | Dense, Wet, Brown, CLAYEY SAND WITH GRAVEL | SC | 12-14-16 $N_{60}=42$ | 10 | × | ⊙ | |
| | | | | | | End of boring, 20' | | | | | | |



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PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/18/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/18/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 15.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0603° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2148° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-15

| | | |
|--------------|-------------------|----------|
| Water | ▽ While Drilling | 13 feet |
| | ▼ Upon Completion | N/A feet |
| | ▽ Cave Depth | 4 feet |

BORING LOCATION:
See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA | | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|---|---------------------|---------------------------|-------------|--------------------------------|------------|--------------------|
| | | | | | | | | | | N in blows/ft ⊙ | Moisture × | |
| 0 | | | | | | TOPSOIL (4") Brown, SILTY CLAY , (Driller's Description) Stiff, Moist, Brown, SANDY LEAN CLAY | TOPSOIL CL-ML | | | | | |
| | 1 | | | 1 | 4 | | CL | 3-4-6 $N_{60}=14$ | 21 | × | ⊙ | * |
| | 5 | | | 2 | 18 | Very Dense, Moist, Brown, POORLY GRADED SAND WITH GRAVEL | SP | 12-19-22 $N_{60}=58$ | 6 | × | ⊙ | >> |
| | 5 | | | 3 | 18 | Extremely Dense, Moist, Gray, WELL GRADED SAND WITH GRAVEL | SW | 23-33-36 $N_{60}=97$ | 4 | × | ⊙ | >> |
| | 10 | | | 4 | 16 | Dense, Moist, Gray, POORLY GRADED GRAVEL WITH CLAY AND SAND | GP-GC | 17-20-15 $N_{60}=49$ | 4 | × | ⊙ | |
| | 15 | | | 5 | 10 | Medium Dense, Wet, Brown, CLAYEY SAND WITH GRAVEL | SC | 6-7-7 $N_{60}=20$ | 10 | × | ⊙ | |
| | | | | | | End of boring, 15' | | | | | | |



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PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/18/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/18/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 20.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.06° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2148° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-16

Water
 ∇ While Drilling 12 feet
 ▼ Upon Completion N/A feet
 ▽ Cave Depth 8 feet

BORING LOCATION:
 See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | STANDARD PENETRATION TEST DATA | | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|--|---------------------|---------------------------|--------------------------------|-------------|--------------------|
| | | | | | | | | | N in blows/ft @ | Moisture, % | |
| 0 | | | | | | TOPSOIL (4.5") Brown, SILTY CLAY , (Driller's Description) | TOPSOIL CL-ML | | | | |
| | | | | 1 | 18 | Stiff, Moist, Brown, FAT CLAY WITH SAND | CH | 2-3-4 $N_{60}=10$ | 20 | ⊗ | |
| | | | | 2 | 18 | Very Dense, Moist, Brown, CLAYEY GRAVEL WITH SAND | GC | 15-25-23 $N_{60}=68$ | 5 | × | >>⊗ Fines=14.4% |
| | | | | 3 | 5 | Extremely Dense, Moist, Gray, POORLY GRADED SAND WITH CLAY AND GRAVEL | SP | 30-50/3 | 2 | × | >>⊗ |
| | | | | 4 | 18 | Dense, Moist, Gray, WELL GRADED SAND WITH CLAY AND GRAVEL | SW-SC | 24-13-8 $N_{60}=30$ | 5 | × | |
| | | | | 5 | 18 | Medium Dense, Wet, Brown, POORLY GRADED SAND | SP | 4-7-7 $N_{60}=20$ | 25 | ⊗ | |
| | | | | 6 | 18 | Medium Dense, Wet, Brown, POORLY GRADED SAND WITH CLAY | SP-SC | 9-9-9 $N_{60}=25$ | 14 | × | |
| | | | | | | End of boring, 20' | | | | | |



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PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
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 45373

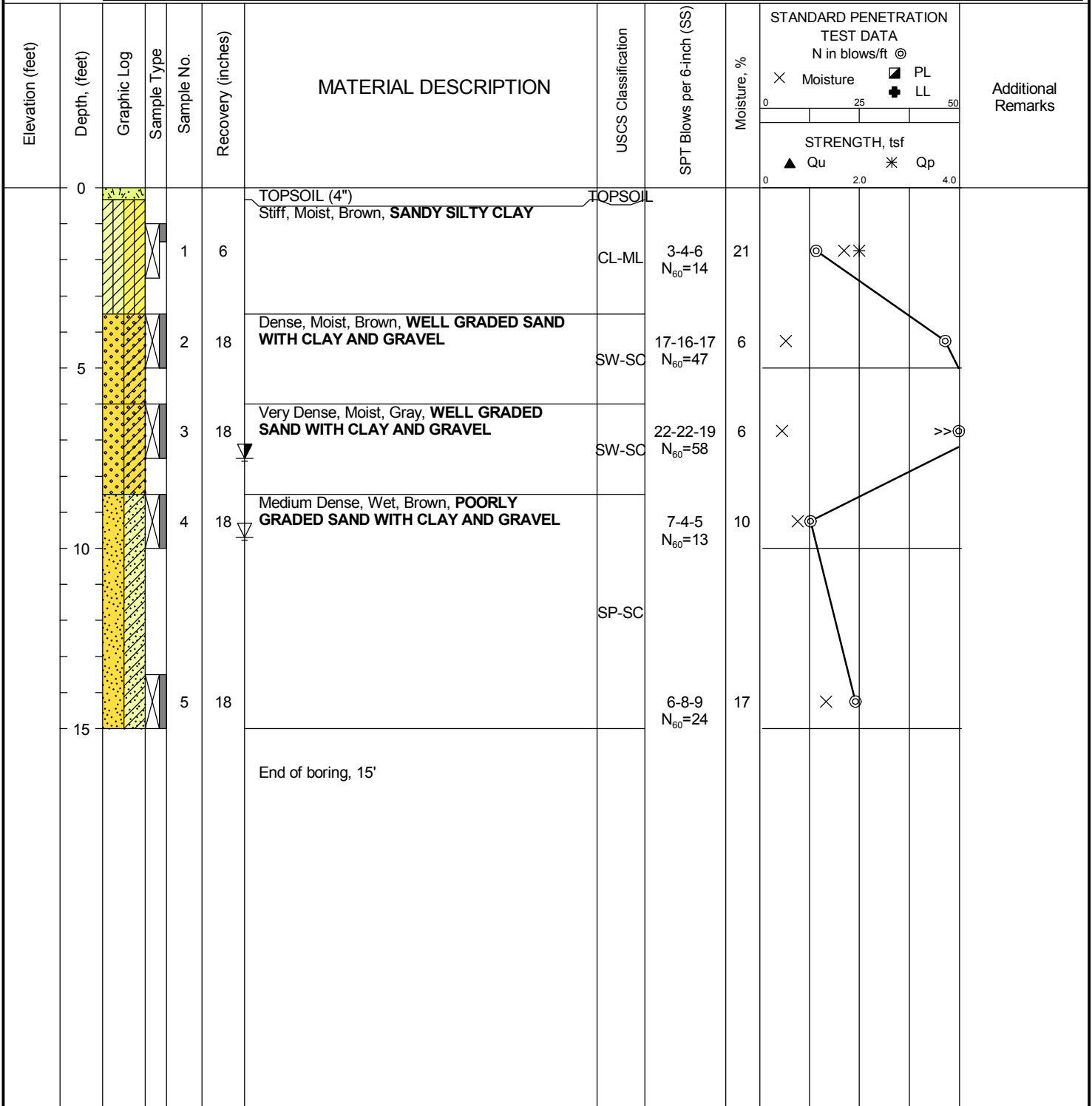
DATE STARTED: 9/18/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/18/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 15.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0597° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2148° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-17

| | | |
|--------------|-------------------|----------|
| Water | ▽ While Drilling | 9.7 feet |
| | ▼ Upon Completion | N/A feet |
| | ▽ Cave Depth | 7.5 feet |

BORING LOCATION:
See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.



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PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373

DATE STARTED: 9/18/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/18/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 20.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0603° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2144° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-18

Water
 ∇ While Drilling 11 feet
 ▼ Upon Completion N/A feet
 ▽ Cave Depth 6 feet

BORING LOCATION:
 See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft @ | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|--|---------------------|---------------------------|-------------|---|--------------------|
| 0 | | | | | | TOPSOIL (4.5") Brown, SILTY CLAY , (Driller's Description) | TOPSOIL CL-ML | | | | |
| | 1 | | | 1 | 5 | Very Stiff, Moist, Brown, SANDY FAT CLAY | CH | 3-5-12 $N_{60}=24$ | 18 | × | ⊙ |
| | 2 | | | 2 | 18 | Dense, Moist, Brown, WELL GRADED SAND WITH CLAY AND GRAVEL | SW-SC | 12-15-20 $N_{60}=49$ | 6 | × | ⊙ |
| | 3 | | | 3 | 10 | Very Dense, Moist, Gray, WELL GRADED GRAVEL WITH SAND | GW | 11-19-21 $N_{60}=56$ | 5 | × | ⊙ |
| | 4 | | | 4 | 18 | Dense, Moist, Brown, CLAYEY SAND WITH GRAVEL | SC | 21-15-12 $N_{60}=38$ | 7 | × | ⊙ |
| | 5 | | | 5 | 18 | Very Dense, Wet, Brown, CLAYEY GRAVEL WITH SAND | GC | 28-20-23 $N_{60}=61$ | 13 | × | ⊙ |
| | 6 | | | 6 | 5 | Very Dense, Wet, Brown, POORLY GRADED GRAVEL WITH CLAY AND SAND | GP-GC | 37-26-30 $N_{60}=79$ | 11 | × | ⊙ |
| | 7 | | | 7 | 18 | Extremely Dense, Wet, Brown, CLAYEY GRAVEL WITH SAND | GC | 22-26-50/6 | 6 | × | ⊙ |
| | | | | | | End of boring, 20' | | | | | |



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PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
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 45373

DATE STARTED: 9/18/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/18/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 15.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.06° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2143° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-19

| | | |
|-------|-------------------|----------|
| Water | ▽ While Drilling | 8.5 feet |
| | ▼ Upon Completion | 6 feet |
| | ▽ Cave Depth | 8 feet |

BORING LOCATION:
See boring location plan

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft @ | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|---|---------------------|---------------------------|-------------|---|--------------------|
| 0 | | | | | | TOPSOIL (4") Brown, SILTY CLAY , (Driller's Description) Stiff, Moist, Brown, LEAN CLAY | TOPSOIL CL-ML | | | | |
| | 1 | | | 1 | 18 | | CL | 2-4-4 $N_{60}=11$ | 19 | ⊙ × * | |
| | 2 | | | 2 | 7 | Medium Dense, Moist, Brown, POORLY GRADED GRAVEL WITH CLAY AND SAND | GP-GC | 6-6-7 $N_{60}=18$ | 8 | × ⊙ | Fines=11.5% |
| | 5 | | | 3 | 8 | Dense, Moist, Brown, WELL GRADED SAND WITH CLAY AND GRAVEL | SW-SC | 9-11-10 $N_{60}=30$ | 7 | × ⊙ | |
| | 10 | | | 4 | 13 | Extremely Dense, Wet, Brown, CLAYEY GRAVEL WITH SAND | GC | 10-13-50/5 | 12 | × ⊙ | |
| | 15 | | | 5 | 1 | Extremely Dense, Wet, Brown, POORLY GRADED GRAVEL WITH CLAY | GP-GC | 50/5 | 3 | × ⊙ | |
| | | | | | | Boring terminated due to refusal, 13.9' | | | | | |



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PROJECT: Tri County Health Development
LOCATION: County Road 25A
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 45373

DATE STARTED: 9/18/18 **DRILL COMPANY:** Central Star
DATE COMPLETED: 9/18/18 **DRILLER:** TG **LOGGED BY:** ST
COMPLETION DEPTH: 20.0 ft **DRILL RIG:** CME 55LC
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** 2-in SS/SPT
LATITUDE: 40.0597° **HAMMER TYPE:** Automatic
LONGITUDE: -84.2143° **EFFICIENCY:** 85%
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** RAS

BORING B-20

Water
 ∇ While Drilling 9.8 feet
 ▼ Upon Completion N/A feet
 ▽ Cave Depth 7 feet

BORING LOCATION:
 See boring location plan

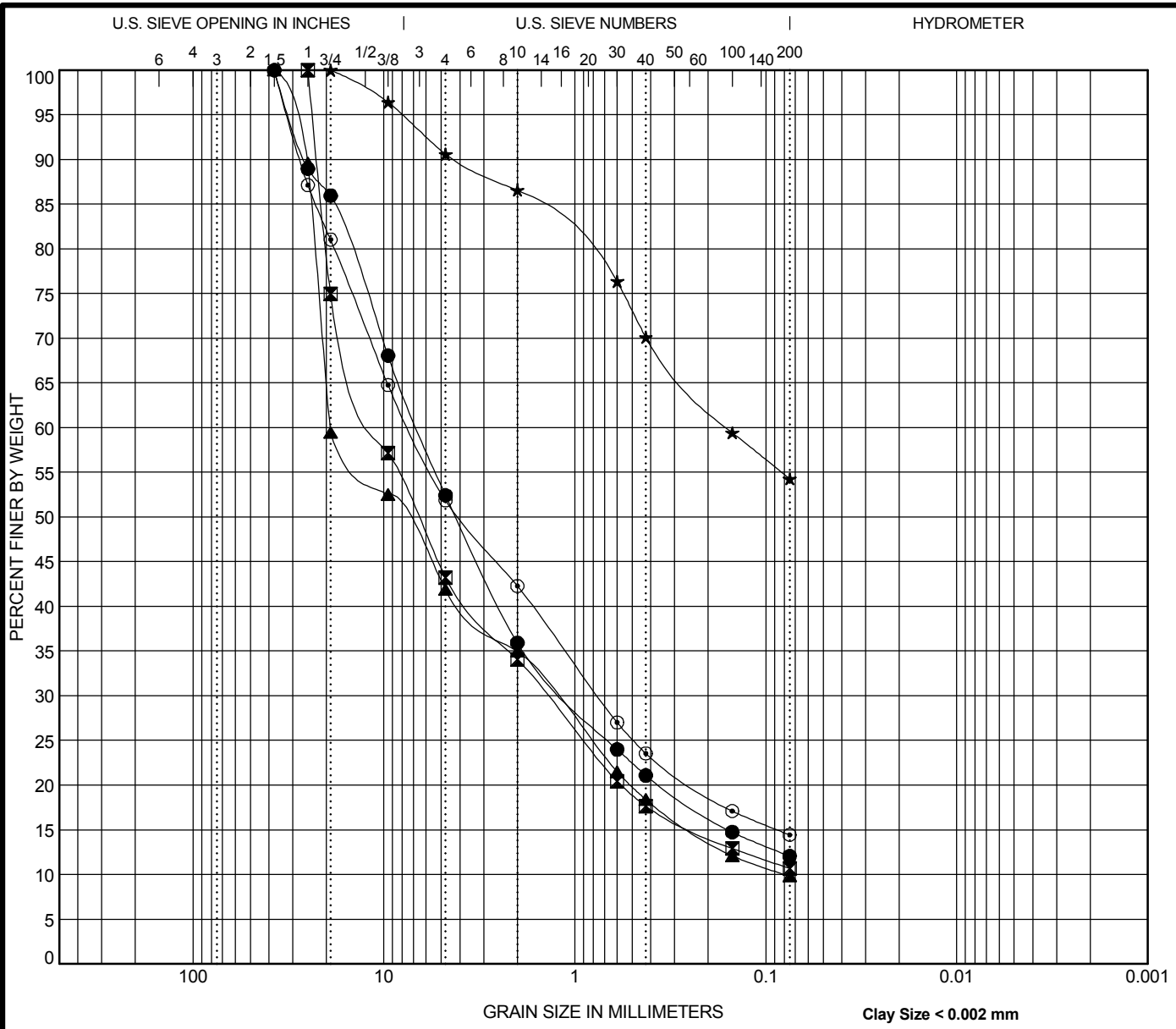
REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633.

| Elevation (feet) | Depth (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | SPT Blows per 6-inch (SS) | Moisture, % | STANDARD PENETRATION TEST DATA N in blows/ft @ | Additional Remarks |
|------------------|--------------|-------------|-------------|------------|-------------------|--|---------------------|---------------------------|-------------|---|--------------------|
| 0 | | | | | | TOPSOIL (4") Brown, SILTY CLAY , (Driller's Description) | TOPSOIL CL-ML | | | | |
| | 1 | | | 1 | 18 | Stiff, Moist, Brown, FAT CLAY WITH SAND | CH | 3-3-4 $N_{60}=10$ | 20 | ⊗ × * | |
| | 2 | | | 2 | 18 | Dense, Moist, Brown, WELL GRADED GRAVEL WITH CLAY AND SAND | GW-GC | 11-10-14 $N_{60}=34$ | 5 | × ⊗ | Fines=9.5% |
| | 3 | | | 3 | 14 | Extremely Dense, Moist, Gray, WELL GRADED SAND WITH CLAY AND GRAVEL | SW-SC | 11-18-50/4 | 5 | × ⊗ | |
| | 4 | | | 4 | 18 | Dense, Wet, Brown, CLAYEY SAND WITH GRAVEL | SC | 13-16-11 $N_{60}=38$ | 10 | × ⊗ | |
| | 5 | | | 5 | 3 | Dense, Wet, Brown, POORLY GRADED GRAVEL WITH CLAY AND SAND | GP-GC | 16-14-11 $N_{60}=35$ | 9 | × ⊗ | |
| | 6 | | | 6 | 18 | Very Dense, Wet, Brown, CLAYEY SAND WITH GRAVEL | SC | 8-20-20 $N_{60}=56$ | 11 | × ⊗ >> | |
| | | | | | | End of boring, 20' | | | | | |



Professional Service Industries, Inc.
 5599 Webster Street
 Dayton, OH 45414
 Telephone: (937) 898-1200

PROJECT NO.: 01051337
PROJECT: Tri County Health Development
LOCATION: County Road 25A
 Troy, Ohio
 45373



| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|-------------------------|--|----|----|----|------|--------|
| ● B-01 | 4.3 CLAYEY GRAVEL WITH SAND (GC) | | | | 4.15 | 151.02 |
| ⊠ B-06 | 6.8 POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC) | | | | 3.02 | 173.90 |
| ▲ B-10 | 4.3 WELL GRADED GRAVEL WITH CLAY AN SAND (GW-GC) | | | | 1.09 | 240.77 |
| ★ B-12 | 1.8 SANDY FAT CLAY (CH) | 63 | 26 | 37 | | |
| ⊙ B-16 | 4.3 CLAYEY GRAVEL WITH SAND (GC) | | | | | |

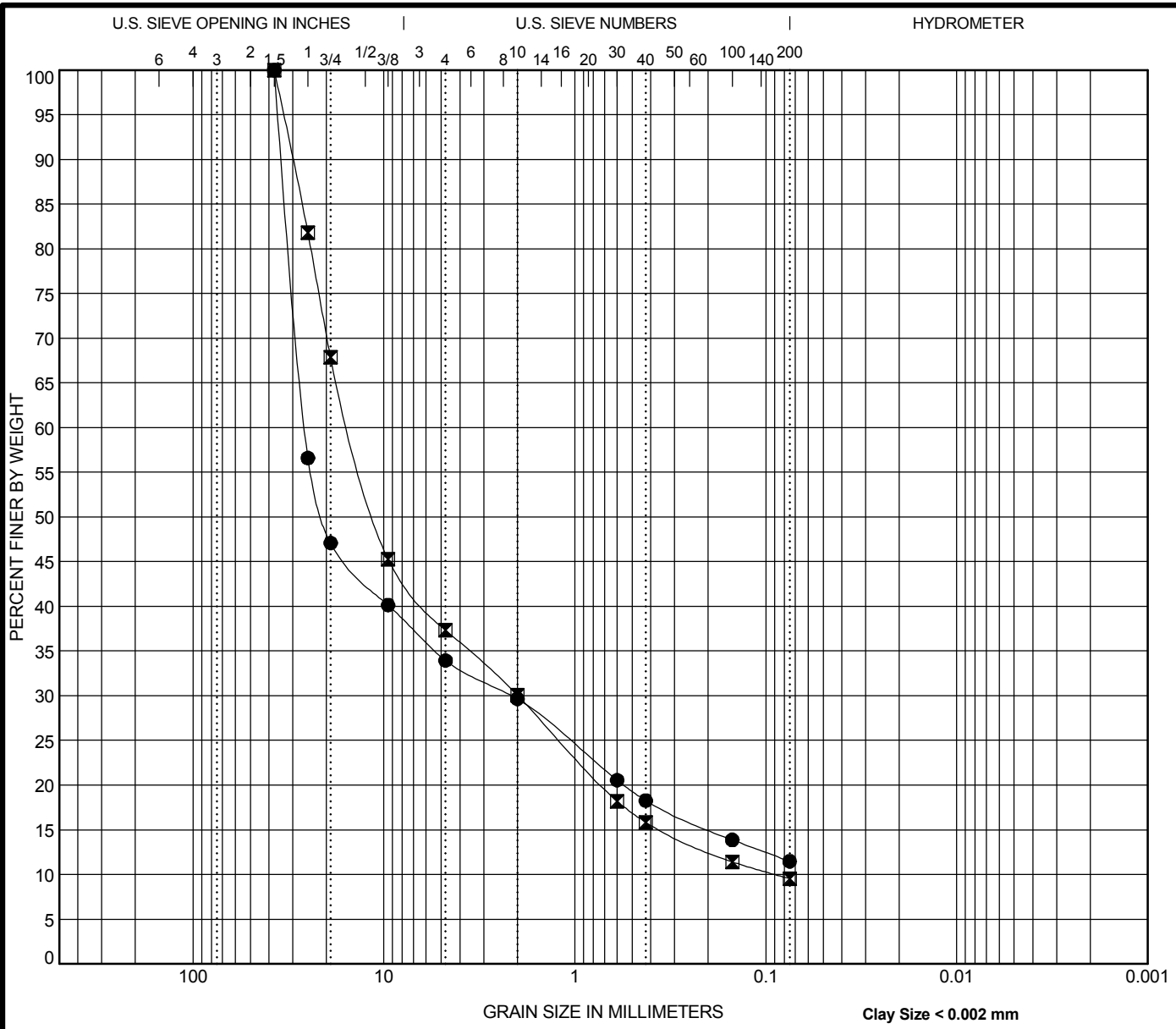
| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|-------------------------|------|------|--------|-------|---------|-------|-------|-------|
| ● B-01 | 4.3 | 37.5 | 6.646 | 1.101 | 47.6 | 40.4 | 12.1 | |
| ⊠ B-06 | 6.8 | 25 | 10.616 | 1.399 | 56.8 | 32.6 | 10.7 | |
| ▲ B-10 | 4.3 | 37.5 | 19.096 | 1.283 | 0.079 | 58.1 | 32.1 | 9.8 |
| ★ B-12 | 1.8 | 19 | 0.159 | | 9.4 | 36.3 | 54.3 | |
| ⊙ B-16 | 4.3 | 37.5 | 7.356 | 0.76 | 48.1 | 37.4 | 14.4 | |



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 5599 Webster Street
 Dayton, OH 45414
 Telephone: (937) 898-1200
 Fax: (937) 898-1230

GRAIN SIZE DISTRIBUTION

Project: Tri County Health Development
 PSI Job No.: 01051337
 Location: County Road 25A
 Troy, Ohio



| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Classification | LL | PL | PI | Cc | Cu |
|-------------------------|---|----|----|----|------|--------|
| ● B-19 | 4.3 POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC) | | | | 3.63 | 526.31 |
| ☒ B-20 | 4.3 WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC) | | | | 2.95 | 166.68 |

| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|-------------------------|------|------|--------|-------|---------|-------|-------|-------|
| ● B-19 | 4.3 | 37.5 | 25.807 | 2.145 | 66.1 | 22.5 | 11.5 | |
| ☒ B-20 | 4.3 | 37.5 | 14.922 | 1.986 | 0.09 | 62.7 | 27.8 | 9.5 |



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GRAIN SIZE DISTRIBUTION

Project: Tri County Health Development
 PSI Job No.: 01051337
 Location: County Road 25A
 Troy, Ohio

Design Maps Summary Report

User-Specified Input

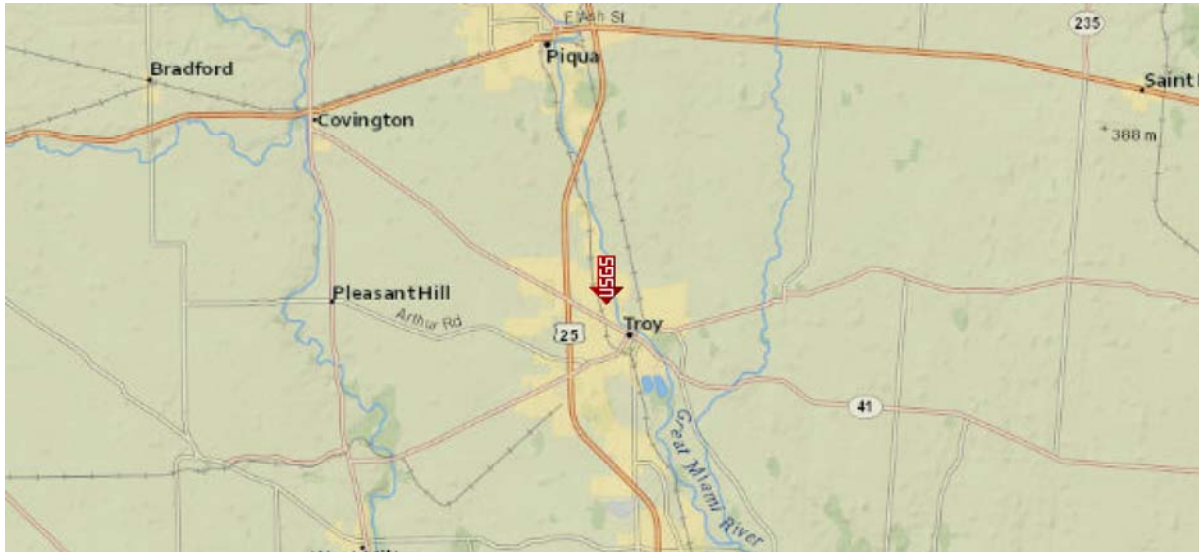
Report Title Tri-County Health Development
 Mon October 15, 2018 17:39:28 UTC

Building Code Reference Document 2006/2009 International Building Code
 (which utilizes USGS hazard data available in 2002)

Site Coordinates 40.06°N, 84.2145°W

Site Soil Classification Site Class D – “Stiff Soil”

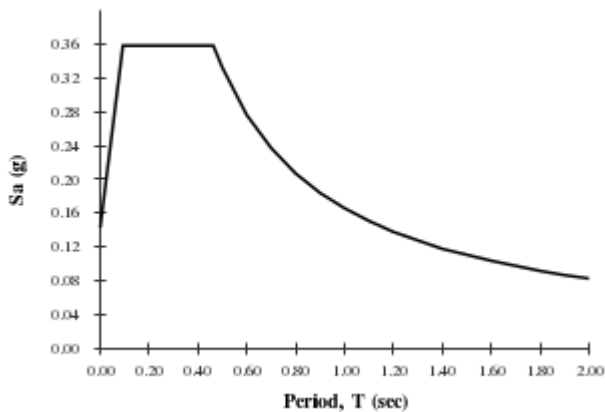
Occupancy Category I/II/III



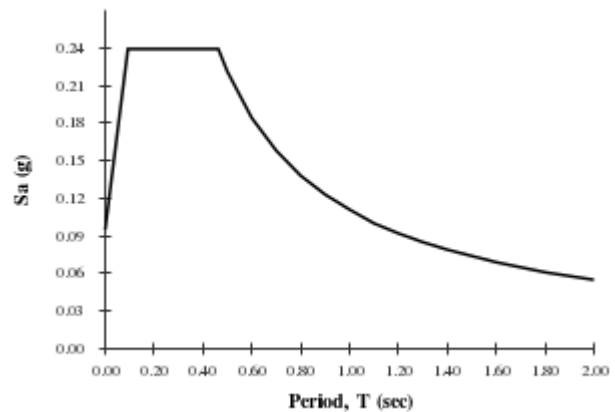
USGS-Provided Output

| | | |
|-------------------------|----------------------------|----------------------------|
| $S_s = 0.224 \text{ g}$ | $S_{MS} = 0.358 \text{ g}$ | $S_{DS} = 0.239 \text{ g}$ |
| $S_1 = 0.069 \text{ g}$ | $S_{M1} = 0.166 \text{ g}$ | $S_{D1} = 0.111 \text{ g}$ |

MCE Response Spectrum



Design Response Spectrum



Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.


Design Maps Detailed Report

2006/2009 International Building Code (40.06°N, 84.2145°W)

Site Class D – “Stiff Soil”, Occupancy Category I/II/III

Section 1613.5.1 — Mapped acceleration parameters

Note: Maps in the 2006 and 2009 International Building Code are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 1613.5.3.

From [Figure 1613.5\(1\)](#) ^[1] $S_S = 0.224 \text{ g}$

From [Figure 1613.5\(2\)](#) ^[2] $S_1 = 0.069 \text{ g}$

Section 1613.5.2 — Site class definitions

| SITE CLASS | SOIL PROFILE NAME | Soil shear wave velocity, \bar{v}_s, (ft/s) | Standard penetration resistance, \bar{N} | Soil undrained shear strength, \bar{s}_u, (psf) |
|-------------------|-------------------------------|---|--|---|
| A | Hard rock | $\bar{v}_s > 5,000$ | N/A | N/A |
| B | Rock | $2,500 < \bar{v}_s \leq 5,000$ | N/A | N/A |
| C | Very dense soil and soft rock | $1,200 < \bar{v}_s \leq 2,500$ | $\bar{N} > 50$ | $> 2,000 \text{ psf}$ |
| D | Stiff soil profile | $600 \leq \bar{v}_s < 1,200$ | $15 \leq \bar{N} \leq 50$ | 1,000 to 2,000 psf |
| E | Stiff soil profile | $\bar{v}_s < 600$ | $\bar{N} < 15$ | $< 1,000 \text{ psf}$ |
| E | — | Any profile with more than 10 ft of soil having the characteristics: <ol style="list-style-type: none"> 1. Plasticity index $PI > 20$, 2. Moisture content $w \geq 40\%$, and 3. Undrained shear strength $\bar{s}_u < 500 \text{ psf}$ | | |
| F | — | Any profile containing soils having one or more of the following characteristics: <ol style="list-style-type: none"> 1. Soils vulnerable to potential failure or collapse under seismic loading such as liquefiable soils, quick and highly sensitive clays, collapsible weakly cemented soils. 2. Peats and/or highly organic clays ($H > 10$ feet of peat and/or highly organic clay where H = thickness of soil) 3. Very high plasticity clays ($H > 25$ feet with plasticity index $PI > 75$) 4. Very thick soft/medium stiff clays ($H > 120$ feet) | | |

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 1613.5.3 — Site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters

TABLE 1613.5.3(1)
VALUES OF SITE COEFFICIENT F_a

| Site Class | Mapped Spectral Response Acceleration at Short Period | | | | |
|------------|---|--------------|--------------|--------------|-----------------|
| | $S_s \leq 0.25$ | $S_s = 0.50$ | $S_s = 0.75$ | $S_s = 1.00$ | $S_s \geq 1.25$ |
| A | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| B | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| C | 1.2 | 1.2 | 1.1 | 1.0 | 1.0 |
| D | 1.6 | 1.4 | 1.2 | 1.1 | 1.0 |
| E | 2.5 | 1.7 | 1.2 | 0.9 | 0.9 |
| F | See Section 11.4.7 of ASCE 7 | | | | |

Note: Use straight-line interpolation for intermediate values of S_s

For Site Class = D and $S_s = 0.224$ g, $F_a = 1.600$

TABLE 1613.5.3(2)
VALUES OF SITE COEFFICIENT F_v

| Site Class | Mapped Spectral Response Acceleration at 1-s Period | | | | |
|------------|---|--------------|--------------|--------------|-----------------|
| | $S_1 \leq 0.10$ | $S_1 = 0.20$ | $S_1 = 0.30$ | $S_1 = 0.40$ | $S_1 \geq 0.50$ |
| A | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| B | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| C | 1.7 | 1.6 | 1.5 | 1.4 | 1.3 |
| D | 2.4 | 2.0 | 1.8 | 1.6 | 1.5 |
| E | 3.5 | 3.2 | 2.8 | 2.4 | 2.4 |
| F | See Section 11.4.7 of ASCE 7 | | | | |

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.069$ g, $F_v = 2.400$

In the equations below, the equation number corresponding to the 2006 edition is listed first, and that corresponding to the 2009 edition is listed second.

Equation (16-37; 16-36): $S_{MS} = F_a S_s = 1.600 \times 0.224 = 0.358 \text{ g}$

Equation (16-38; 16-37): $S_{M1} = F_v S_1 = 2.400 \times 0.069 = 0.166 \text{ g}$

Section 1613.5.4 — Design spectral response acceleration parameters

Equation (16-39; 16-38): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 0.358 = 0.239 \text{ g}$

Equation (16-40; 16-39): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.166 = 0.111 \text{ g}$

Section 1613.5.6 — Determination of seismic design category

TABLE 1613.5.6(1)
SEISMIC DESIGN CATEGORY BASED ON SHORT-PERIOD RESPONSE ACCELERATION

| VALUE OF S_{DS} | OCCUPANCY CATEGORY | | |
|------------------------------|--------------------|-----|----|
| | I or II | III | IV |
| $S_{DS} < 0.167g$ | A | A | A |
| $0.167g \leq S_{DS} < 0.33g$ | B | B | C |
| $0.33g \leq S_{DS} < 0.50g$ | C | C | D |
| $0.50g \leq S_{DS}$ | D | D | D |

For Occupancy Category = I and $S_{DS} = 0.239 g$, Seismic Design Category = B

TABLE 1613.5.6(2)
SEISMIC DESIGN CATEGORY BASED ON 1-SECOND PERIOD RESPONSE ACCELERATION

| VALUE OF S_{D1} | OCCUPANCY CATEGORY | | |
|-------------------------------|--------------------|-----|----|
| | I or II | III | IV |
| $S_{D1} < 0.067g$ | A | A | A |
| $0.067g \leq S_{D1} < 0.133g$ | B | B | C |
| $0.133g \leq S_{D1} < 0.20g$ | C | C | D |
| $0.20g \leq S_{D1}$ | D | D | D |

For Occupancy Category = I and $S_{D1} = 0.111 g$, Seismic Design Category = B

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Occupancy Categories I, II, and III, and **F** for those in Occupancy Category IV, irrespective of the above.

Seismic Design Category \equiv "the more severe design category in accordance with Table 1613.5.6(1) or 1613.5.6(2)" = B

Note: See Section 1613.5.6.1 for alternative approaches to calculating Seismic Design Category.

References

1. Figure 1613.5(1): [https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2006-Figure1613_5\(01\).pdf](https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2006-Figure1613_5(01).pdf)
2. Figure 1613.5(2): [https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2006-Figure1613_5\(02\).pdf](https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2006-Figure1613_5(02).pdf)



GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

| | |
|--|--|
| SFA: Solid Flight Auger - typically 4" diameter flights, except where noted. | SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted. |
| HSA: Hollow Stem Auger - typically 3 1/4" or 4 1/4" I.D. openings, except where noted. | ST: Shelby Tube - 3" O.D., except where noted. |
| M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry | BS: Bulk Sample |
| R.C.: Diamond Bit Core Sampler | PM: Pressuremeter |
| H.A.: Hand Auger | CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings |
| P.A.: Power Auger - Handheld motorized auger | |

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
 N_{60} : A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
 Q_u : Unconfined compressive strength, TSF
 Q_p : Pocket penetrometer value, unconfined compressive strength, TSF
 $w\%$: Moisture/water content, %
 LL: Liquid Limit, %
 PL: Plastic Limit, %
 PI: Plasticity Index = (LL-PL), %
 DD: Dry unit weight, pcf
 ▼, ▼, ▼ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

| Relative Density | N - Blows/foot |
|------------------|----------------|
| Very Loose | 0 - 4 |
| Loose | 4 - 10 |
| Medium Dense | 10 - 30 |
| Dense | 30 - 50 |
| Very Dense | 50 - 80 |
| Extremely Dense | 80+ |

ANGULARITY OF COARSE-GRAINED PARTICLES

| Description | Criteria |
|-------------|--|
| Angular: | Particles have sharp edges and relatively plane sides with unpolished surfaces |
| Subangular: | Particles are similar to angular description, but have rounded edges |
| Subrounded: | Particles have nearly plane sides, but have well-rounded corners and edges |
| Rounded: | Particles have smoothly curved sides and no edges |

GRAIN-SIZE TERMINOLOGY

| Component | Size Range |
|------------------------|--|
| Boulders: | Over 300 mm (>12 in.) |
| Cobbles: | 75 mm to 300 mm (3 in. to 12 in.) |
| Coarse-Grained Gravel: | 19 mm to 75 mm (3/4 in. to 3 in.) |
| Fine-Grained Gravel: | 4.75 mm to 19 mm (No.4 to 3/4 in.) |
| Coarse-Grained Sand: | 2 mm to 4.75 mm (No.10 to No.4) |
| Medium-Grained Sand: | 0.42 mm to 2 mm (No.40 to No.10) |
| Fine-Grained Sand: | 0.075 mm to 0.42 mm (No. 200 to No.40) |
| Silt: | 0.0075 mm to 0.075 mm |
| Clay: | <0.0075 mm (< 3/64 in.) |

PARTICLE SHAPE

| Description | Criteria |
|-------------------|---|
| Flat: | Particles with width/thickness ratio > 3 |
| Elongated: | Particles with length/width ratio > 3 |
| Flat & Elongated: | Particles meet criteria for both flat and elongated |

RELATIVE PROPORTIONS OF FINES

| Descriptive Term | % Dry Weight |
|------------------|--------------|
| Trace: | < 5% |
| With: | 5% to 12% |
| Modifier: | >12% |



GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

| <u>Q_u - TSF</u> | <u>N - Blows/foot</u> | <u>Consistency</u> |
|----------------------------|-----------------------|---------------------|
| 0 - 0.25 | 0 - 2 | Very Soft |
| 0.25 - 0.50 | 2 - 4 | Soft |
| 0.50 - 1.00 | 4 - 8 | Firm (Medium Stiff) |
| 1.00 - 2.00 | 8 - 15 | Stiff |
| 2.00 - 4.00 | 15 - 30 | Very Stiff |
| 4.00 - 8.00 | 30 - 50 | Hard |
| 8.00+ | 50+ | Very Hard |

MOISTURE CONDITION DESCRIPTION

| <u>Description</u> | <u>Criteria</u> |
|--------------------|---|
| Dry: | Absence of moisture, dusty, dry to the touch |
| Moist: | Damp but no visible water |
| Wet: | Visible free water, usually soil is below water table |

RELATIVE PROPORTIONS OF SAND AND GRAVEL

| <u>Descriptive Term</u> | <u>% Dry Weight</u> |
|-------------------------|---------------------|
| Trace: | < 15% |
| With: | 15% to 30% |
| Modifier: | >30% |

STRUCTURE DESCRIPTION

| <u>Description</u> | <u>Criteria</u> | <u>Description</u> | <u>Criteria</u> |
|--------------------|---|--------------------|---|
| Stratified: | Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick | Blocky: | Cohesive soil that can be broken down into small angular lumps which resist further breakdown |
| Laminated: | Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick | Lensed: | Inclusion of small pockets of different soils |
| Fissured: | Breaks along definite planes of fracture with little resistance to fracturing | Layer: | Inclusion greater than 3 inches thick (75 mm) |
| Slickensided: | Fracture planes appear polished or glossy, sometimes striated | Seam: | Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample |
| | | Parting: | Inclusion less than 1/8-inch (3 mm) thick |

SCALE OF RELATIVE ROCK HARDNESS

| <u>Q_u - TSF</u> | <u>Consistency</u> |
|----------------------------|--------------------|
| 2.5 - 10 | Extremely Soft |
| 10 - 50 | Very Soft |
| 50 - 250 | Soft |
| 250 - 525 | Medium Hard |
| 525 - 1,050 | Moderately Hard |
| 1,050 - 2,600 | Hard |
| >2,600 | Very Hard |

ROCK BEDDING THICKNESSES

| <u>Description</u> | <u>Criteria</u> |
|--------------------|---------------------------------------|
| Very Thick Bedded | Greater than 3-foot (>1.0 m) |
| Thick Bedded | 1-foot to 3-foot (0.3 m to 1.0 m) |
| Medium Bedded | 4-inch to 1-foot (0.1 m to 0.3 m) |
| Thin Bedded | 1¼-inch to 4-inch (30 mm to 100 mm) |
| Very Thin Bedded | ½-inch to 1¼-inch (10 mm to 30 mm) |
| Thickly Laminated | 1/8-inch to ½-inch (3 mm to 10 mm) |
| Thinly Laminated | 1/8-inch or less "paper thin" (<3 mm) |

ROCK VOIDS

| <u>Voids</u> | <u>Void Diameter</u> |
|--------------|---------------------------------|
| Pit | <6 mm (<0.25 in) |
| Vug | 6 mm to 50 mm (0.25 in to 2 in) |
| Cavity | 50 mm to 600 mm (2 in to 24 in) |
| Cave | >600 mm (>24 in) |

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

| <u>Component</u> | <u>Size Range</u> |
|---------------------|--------------------|
| Very Coarse Grained | >4.76 mm |
| Coarse Grained | 2.0 mm - 4.76 mm |
| Medium Grained | 0.42 mm - 2.0 mm |
| Fine Grained | 0.075 mm - 0.42 mm |
| Very Fine Grained | <0.075 mm |

ROCK QUALITY DESCRIPTION




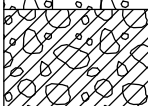

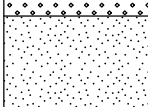
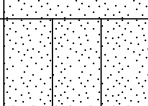
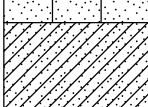

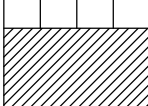


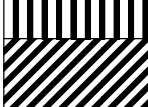
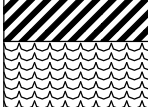
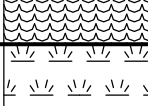
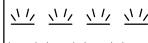
| <u>Rock Mass Description</u> | <u>RQD Value</u> |
|------------------------------|------------------|
| Excellent | 90 -100 |
| Good | 75 - 90 |
| Fair | 50 - 75 |
| Poor | 25 -50 |
| Very Poor | Less than 25 |

DEGREE OF WEATHERING

| | |
|---------------------|---|
| Slightly Weathered: | Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact. |
| Weathered: | Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife. |
| Highly Weathered: | Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife. |

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

| MAJOR DIVISIONS | | | SYMBOLS | | TYPICAL DESCRIPTIONS |
|---|---|---|---|---|--|
| | | | GRAPH | LETTER | |
| COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE | GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE | CLEAN GRAVELS (LITTLE OR NO FINES) |  | GW | WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | | GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES) |  | GP | POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | | |  | GM | SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES |
| | | |  | GC | CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES |
| | SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE | CLEAN SANDS (LITTLE OR NO FINES) |  | SW | WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES |
| | | SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES) |  | SP | POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES |
| | | |  | SM | SILTY SANDS, SAND - SILT MIXTURES |
| | | |  | SC | CLAYEY SANDS, SAND - CLAY MIXTURES |
| | FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE | SILTS AND CLAYS LIQUID LIMIT LESS THAN 50 |  | ML | INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY |
| | | |  | CL | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS |
|  | | | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY | |
| SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50 | |  | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS | |
| | |  | CH | INORGANIC CLAYS OF HIGH PLASTICITY | |
| | |  | OH | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS | |
| | |  | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS | |
| HIGHLY ORGANIC SOILS | | |  | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS |



DIVISION

01

GENERAL REQUIREMENTS

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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Intent of the Work
2. Project Information.
3. Work Covered by Contract Documents.
4. Contractor's use of Site and Premises.
5. Work by Owner.
6. Work Restrictions.
7. Specification and Drawing Conventions.
8. Permits fees & notices
9. Verifications of existing dimensions.
10. Miscellaneous Provisions

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls".

1.2 INTENT OF THE WORK

A. The Intent of the Work, covered by the Contract Documents, shall be to provide all labor, materials, facilities, and administration as required and necessary to complete the Work within the time stipulated.

1. The Contractor for this Bid Package shall execute, perform and accomplish all Work necessary to achieve the intent of the Contract Documents and shall have no claims against the Owner, Architect, or any of their agents for extra work except for Extra Work, which is authorized by Change Order and signed by all parties

1.3 PROJECT INFORMATION

A. Project Identification:

1. Project Location: 1280 N. County Road 25-A, Troy, Ohio 45373.

B. Owner:

1. Owner's Representatives:
 - a. David Brown: Carter & Cline
 - b. Email: dbrown@carterandcline.com

C. Architect: Freytag & Associates, Inc.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. Provide all labor, material, equipment, and supervision to necessary perform the work defined in the contract documents
- B. The following summary of work is listed to highlight specific aspects of the Work and are not meant to limit the scope of the project:
 - 1. Construction of new facility and all site work. The New Building consist of concrete, masonry, CFMF, metal siding, phenolic siding, metal roofing, fiber cement fascia board and miscellaneous carpentry, hollow metal doors and frames, aluminum storefront entrances/windows, finish hardware, glass and glazing. Interior finishes including flooring/base, gypsum board walls, ceilings/soffits, acoustical ceilings, painting, toilet accessories, signage, fire extinguishers and cabinets, casework, plumbing, HVAC, electrical work, fire suppression and technology.
 - 2. Complete all Work as described in the Construction Documents and Project Manual.
 - 3. File the Co-Permittee Notice of Intent for the OEPA Storm Water General Construction Permit.
 - 4. Existing Conditions
 - a. A building pad (aggregate paved area) was previously prepared for the site.
 - b. The perimeter of this pad and grades are shown on Existing Site Conditions drawing.
- C. The following outlines design changes in the contract documents that were changed from the previous set of contract documents dated March 12, 2021. This outline is for informational purposes only, the bidder is still responsible for everything shown or written in the contract documents.
 - 1.
- D. Type of Contract.
 - 1. This phase of the project will be constructed under a single prime contract.

1.5 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Unrestricted Use of Site: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1.6 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner

1.7 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Work hours will be determined at the pre-construction meeting.
- C. Existing Utility Interruptions: Do not interrupt utilities serving adjoining facilities unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 1. Notify Architect and Owner not less than two days in advance of proposed utility interruptions.
 2. Obtain Owner's and any affected Parties written permission before proceeding with utility interruptions.
- D. Smoking and Controlled Substances: Use of tobacco products, alcoholic beverages and other controlled substances is not permitted.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used situations. These conventions are as follows:
 1. Imperative mood and streamlined language are generally used in the Specifications. 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.
 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.9 PERMITS, FEES, AND NOTICES

- A. The Architect will secure the Certificate of Plan Approval from authorities having jurisdiction, and the Owner will pay the fees to obtain the Certificate of Plan Approval with the exception of fees described in paragraph below.

- B. The Contractor shall secure and pay for other permits, governmental fees inspections, and licenses necessary for the proper execution and completion of the Work, which are applicable at the time of bidding. Fees to relocate utilities on Owner's property shall be included in the bid of the Contractor doing the relocation.
 - 1. All Communication related to plan approval, including shop drawing submittals, are required to be made through the Architect.
 - 2. The Architect and applicable Contractor(s) will coordinate shop drawing submittals and correction letter responses with the project schedule.
- C. Utility Tie-Ins: Coordinate and arrange the utility provider and notify the Architect and Owner.
 - 1. Sanitary and Water service is provided by Miami County.
 - 2. **Tap-in Fees from Miami County will be paid by the Owner.**
- D. Fire Protection items require submittal to the Miami County Building Department and also to the Troy Fire Department. Contractor is responsible for permits from both entities.
- E. Inspections of installed work shall be performed by the authority having jurisdiction as arranged for by the Contractor. Work shall not be covered until approved.
- F. The Owner will engage and pay for all required construction testing by a third party consultant.
- G. The Contractor shall give notices and comply with laws, ordinances, rules, regulations, and orders of public authorities bearing on the performance of the Work. If the Contractor observes that the Contract Documents are at variance therewith, the Architect shall be promptly notified in writing, and necessary changes shall be adjusted by appropriate notification. If the Contractor performs the Work knowing it to be contrary to such laws, ordinances, rules, and regulations, and without such notice to the Architect, Contractor shall assume full responsibility of costs to correct such work.

1.10 VERIFICATIONS OF EXISTING DIMENSIONS

- A. When verification of existing dimensions is required, the Contractor shall be responsible for the procurement of the field information.

1.11 MISCELLANEOUS PROVISIONS

- A. Contractor shall enforce strict discipline and good order among his employees or other persons carrying out Work of his Contract and shall not permit employment of unfit person or persons or anyone not skilled in the task assigned to them
- B. Provide all layout and construction staking required to complete this work scope.
- C. Provide all surveys as required per the contract drawings and specifications.
- D. Field measure as required to execute this Scope of Work. To accommodate the schedule, it may be necessary to order material without the benefit of field measurements. Any costs associated with proceeding in this manner shall be included in the base bid amount.

- E. This contractor will ensure all tolerances are met with reference to line and plumb for all applicable work under this bid package.
- F. This contractor shall include all costs for testing as required per the contract documents and as required by local authorities having jurisdiction. Tests shall include, but not be limited to, pipe pressurization tests, chlorination tests, bacteriological, hydrostatic, and mandrel tests, etc.
- G. All construction method, materials, and specifications shall comply with Miami County standards and specifications or the most recent Ohio Department of Transportation construction standards and specifications, whichever is more restrictive as determined by the Architect. Work associated with utilities proved by the City of Troy must follow their standards and specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

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SECTION 012100 – ALLOWANCES

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 administrative and procedural requirements governing allowances.
- B. Types of allowances include the following: Lump Sum Allowances.

1.3 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- B. Submit invoices or delivery slips to show actual quantities of material delivered to the site for use in fulfillment of each allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.4 COORDINATION

- A. Coordinate allowance items with other portions of the Work.

1.5 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials **by Architect** under allowance shall be included as part of the Contract Sum and not part of the allowance.

1.6 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable.

1. Include installation costs in purchase amount.
 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 3. Submit substantiation of a change in scope of work.
 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. **Lump Sum Allowance:** Contractor to include a **Lump Sum Allowance of \$17,000** for a monument sign near the front entry as located on the site plan.
1. Work includes supply and complete installation of the foundation, masonry, sign structural supports, signage, electric wiring and ground spotlighting.
 2. Signage supplied by the Owner selected signage company included in the allowance.
 3. Signage company to include County Zoning Permit.

END OF SECTION 012100

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. 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. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. 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: Revise 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. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

ALT 1 – Turf and Grass 12 Month Extended Turf and Grass Maintenance

- A. Description: Provide a 12 month Extended Turf Maintenance starting on the date of the Notice of Substantial Completion. Provide the extended Maintenance in lieu of the Turf Maintenance Period specified in Turf and Grasses Section 329200 Section 1.9 *Maintenance Service*.
- B. The 12-month Turf Maintenance Period shall conform all items specified in the Turf and Grasses Section 329200 and specifically Sections 3.6 *Turf Maintenance* and 3.7 *Satisfactory Turf*.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

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 administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution will not adversely affect Contractor's construction schedule.
 - c. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - d. Requested substitution is compatible with other portions of the Work.
 - e. Requested substitution has been coordinated with other portions of the Work.
 - f. Requested substitution provides specified warranty.
 - g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice of Award.
 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
 - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

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SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

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. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue Architect's Supplemental Instructions (ASI) authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests (PR): Architect 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. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 14 days 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.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.

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. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order (CO) for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - 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. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 01 Section "Allowances" for procedural requirements governing handling and processing of allowances.
 - 2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate 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. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to architect at earliest possible date but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the 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. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.

- e. Date of submittal.
2. Submit draft of AIA Document G703 Continuation Sheets.
3. Provide a breakdown of the Contract Sum 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 operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training in the amount of 5 percent of the Contract Sum.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. 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. If specified, include evidence of insurance or bonded warehousing.
6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the Schedule of Values for each allowance.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect 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.
 2. Payment for offsite storage facilities will not be considered.
 3. 'Stored material' column of the G703 shall be utilized until said material is permanently in place.
- B. Payment Application Times: Progress payments shall be submitted to Architect by the day of the month agreed upon at the Preconstruction Meeting. The period covered by each Application for Payment is one month, ending on the last day of the month.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect 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 of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. 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.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. 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.
 4. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule.
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
- H. Application for Payment at Substantial Completion: After issuing 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 Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

- I. Final Payment Application: 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. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. Evidence that claims have been settled.
 7. 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.
 8. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - 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. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Administrative and supervisory personnel.
 - 2. Project meetings.
 - 3. Requests for Interpretation (RFIs).
- B. Related Sections include the following:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
 - 2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 COORDINATION

- A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work.
 - 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. 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. Project closeout activities.

1.4 SUBMITTALS

- A. Key Personnel Names: Immediately after award of the Contract, 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 and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1.5 PROJECT MEETINGS

- A. General: 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.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three (3) days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than fifteen (15) days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors;; and other concerned parties shall attend the conference. All 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. Tentative construction schedule.
 - b. Designation of key personnel and their duties.
 - c. Procedures for processing field decisions and Change Orders.
 - d. Procedures for RFIs.
 - e. Procedures for testing and inspecting.
 - f. Procedures for processing Applications for Payment.
 - g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of Record Documents.
 - j. Use of the premises.
 - k. Work restrictions and hours.
 - l. Responsibility for temporary facilities and controls.
 - m. Construction waste management and recycling.
 - n. Parking availability.
 - o. Deliveries and transport.
 - p. First aid.
 - q. Security.
 - r. Progress cleaning.
 3. Minutes: Contractor will record and distribute meeting minutes.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
- C. Progress Meetings: Conduct progress meetings at biweekly intervals or as agreed upon by all parties. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Owner and Architect, contractor, subcontractor, 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 conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. 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 and future planning.
3. Reporting: General Construction Contractor will record and distribute minutes of the meeting to each party present and to parties who should have been present.
 - 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.

1.6 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 1. Project name.
 2. Date.
 3. Name of Contractor.
 4. Name of Architect.
 5. RFI number, numbered sequentially.
 6. Specification Section number and title and related paragraphs, as appropriate.
 7. Drawing number and detail references, as appropriate.
 8. Field dimensions and conditions, as appropriate.
 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 10. Contractor's signature.
 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
- C. Hard-Copy RFIs:
 1. Identify each page of attachments with the RFI number and sequential page number.

- D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow no less than ten (10) working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.
 - f. Incomplete RFIs or RFIs with numerous errors.
 - g. Frivolous or unnecessary RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
 3. Architect'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 Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within ten (10) days of receipt of the RFI response.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.
- G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number.
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were dropped and not submitted.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

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SECTION 013200 - 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. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
- B. Related Sections include the following:
 - 1. Division 01 Section "Payment Procedures" for submitting the Schedule of Values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Division 01 Section "Submittal Procedures" for submitting schedules and reports.

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.
- B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to proceed to date of Final Completion.
- B. The contractor is to identify and include anticipated adverse weather days in the initial progress schedule. Said days should be tracked and documented in progress and daily reports. Subject of delays should be an agenda item of the progress meetings. A delay due to weather or its effects will not be counted until at least 50% of the planned activities wasn't possible. A change order will only be issued once the adverse weather days have been accounted for in the schedule has been exhausted. Monthly schedule updates should identify any additional adverse weather days that occurred in excess of anticipated days of the initial schedule for that month. An adverse weather day due to low temperatures will only be counted if the maximum temperature is $< 32^{\circ}$ F and effected at least 50% of the planned activities.

2.2 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at the Project site:
 1. List of subcontractors at Project site.
 2. Personnel at Project site.
 3. Equipment at Project site.
 4. Material deliveries.
 5. High and low temperatures and general weather conditions.
 6. Accidents.
 7. Meetings and significant decisions.
 8. Unusual events (refer to special reports).
 9. Stoppages, delays, shortages, and losses.
 10. Orders and requests of authorities having jurisdiction.
 11. Change Orders received and implemented.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule three (3) days 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.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, 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.

END OF SECTION 013200

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SECTION 013300 - SUBMITTAL 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. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
 - 3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
 - 4. Division 01 Section "Closeout Procedures" for submitting warranties.
 - 5. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 6. Divisions 02 through 33 Sections for specific requirements for submittals in those Sections.

1.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow not less than ten (10) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect 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 not less than ten (10) days for review of each resubmittal.
- C. Identification: Place a permanent label or title block on each submittal for identification.
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name and address of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - i. Drawing number and detail references, as appropriate.
 - j. Location(s) where product is to be installed, as appropriate.
 - k. Other necessary identification.
- D. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- E. Number of Copies: Submit copies of each submittal as follows, unless otherwise indicated:
 1. Site– two (3) copies **or** one (1) electronic copy in PDF non-secured file format.
Architect – one (1) copy
Contractor – one (1) copy
Owner's Representative– one (1) copy
- F. Additional Copies: Contractor is required to reproduce reviewed submittals as may be required for distribution among contractors, subcontractors, suppliers, manufacturers, etc. Unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Transmittal number, numbered consecutively.
 - g. Submittal and transmittal distribution record.
 - h. Remarks.
 - i. Signature of transmitter.

Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

2. Note date and content of previous submittal.
3. Note date and content of revision in label or title block and clearly indicate extent of revision.

4. Resubmit submittals until they are marked "**APPROVED** or **APPROVED AS NOTED.**"

- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
 1. Use for Construction: Use only final submittals with mark "**APPROVED** or **APPROVED AS NOTED.**" indicating action taken by Architect or Engineer.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.

- B. Product Data/Samples: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. Mark each copy of each submittal to show which products and options are applicable.
 2. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturer's catalog cuts.
 - e. Standard product operation and maintenance manuals.
 - f. Compliance with specified referenced standards.
 - g. Testing by recognized testing agency.
 3. Submit Product Data before or concurrent with Samples.

- 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.
 - a. 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.

- 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.

- E. Submittals Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. 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.
 2. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- C. 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.
- D. 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.
- E. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- F. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- G. 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.
- H. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."
- I. 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.
- J. 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.
- K. 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.
- L. 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.
- M. Construction Photographs: Comply with requirements specified in Division 01 Section "Photographic Documentation."

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 and signature before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name and signature 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 ARCHITECT'S / ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review required submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. Approved: Where the submittal is marked "Approved," the Work covered by the submittal may proceed provided it complies with the Contract Documents. Final acceptance will depend on that compliance.
 - 2. Approved as Noted: Where the submittal is marked "Approved as Noted," the Work covered by the submittal may proceed provided it complies with both Architect's notations and corrections on the submittal and the Contract Documents. Final acceptance will depend on that compliance.
 - 3. Revise and Resubmit: Where the submittal is marked "Revise and Resubmit," do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery or other activity for the product submitted. Revise or prepare a new submittal according to Architect's notations and correction.
 - 4. Rejected: Where the submittal is marked "Rejected," do not proceed with the Work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents.
 - 5. Submit Item Specified: Where the submittal is marked "Submit Item Specified," do not proceed with the Work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents.

END OF SECTION 013300

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SECTION 014520 – TESTING LABORATORY SERVICE

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. The Owner will procure the services of an Independent Testing and Inspection agency for the project as part of their Quality Assurance and Control Program. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- B. Related Sections include the following:
 - 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 2. Divisions 01 through 33 Sections for specific test and inspection requirements.

1.3 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 Architect.
- C. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- D. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., bulk storage location, 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 tradespeople of the corresponding generic name.
- I. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five (5) 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.

1.4 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 Architect 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 Architect for a decision before proceeding.

1.5 REFERENCES

- A. ASTM D1241 – Materials for Soil-Aggregate Subbase, Base, and Surface Courses.
- B. ASTM D1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.
- C. ASTM E329 – Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
- D. NCMA TEK 18-3 – Quality Assurance.

1.6 QUALIFICATIONS OF LABORATORY AND SUBMITTALS

- A. Laboratory qualifications for inspection, sampling and testing of soils and aggregates shall be

comparable to the requirements of ASTM E329.

- B. Testing Equipment: Calibrated at maximum 12 month intervals by devices of accuracy acceptable to the Architect.
- C. Submit documentation of specified requirements. Submit 2 copies to the Architect.
- D. All testing and inspection performed by the testing laboratory shall be under the direct supervision of a professional engineer licensed in the state of the construction activities. This professional engineer shall submit a letter certifying that all testing services are in conformance with the standards and specifications as specified in these Contract Documents. The letter shall also certify that all tested and inspected items and procedures conform to the Contract Documents, except where specifically noted on the inspection reports.
- E. All inspectors shall have at least one year of experience performing the type of inspections to be performed on this project. Qualifications and experience of proposed inspectors shall be submitted to the Architect for approval prior to the beginning of any testing.

1.7 LABORATORY DUTIES, LIMITATIONS OF AUTHORITY

- A. Provide qualified personnel promptly on notice.
- B. Perform specified inspections, sampling, and testing of materials and methods of construction.
 - 1. Comply with specified standards; ASTM, other recognized authorities and as specified.
 - 2. Ascertain compliance with requirements of Contract Documents.
- C. Promptly notify the Architect and Contractor of irregularities in the Work to be performed with the Documents and deficiencies of Work performed which are observed during performance of services.
- D. Promptly submit 2 copies directly to the Architect/Engineer and 1 to the Contractor of reports of inspections and tests, including the following information, as applicable:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing laboratory name and address.
 - 4. Name and signature of field inspector.
 - 5. Date of inspection or sampling.
 - 6. Record of temperature and weather.
 - 7. Name and signature of laboratory inspector.
 - 8. Identification of product and Specification Section.
 - 9. Location in Project.
 - 10. Designation of the Work and test method.
 - 11. Observations regarding compliance with Contract Documents.
 - 12. Complete inspection or test data.
 - 13. Tests results and an interpretation of test results.
 - 14. Recommendations on retesting.

- E. Laboratory is not authorized to:
 - 1. Release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Approve or accept portion of Work.
 - 3. Perform duties of the Contractor.

1.8 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel to provide access to Work and to manufacturer's operations.
- B. Assist laboratory personnel in obtaining samples at the site.
- C. Notify laboratory sufficiently in advance of operations to allow for his assignment of personnel and scheduling of tests.
- D. Should the Contractors fail to schedule laboratory services or fail to cancel laboratory services, if the need arises, all additional cost shall be borne by the Contractors.
- E. Employ, and pay for, services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling, and testing required when initial tests indicate work does not comply with Contract Documents.
 - 1. Separate laboratory shall be approved by the Owner and the Architect.

PART 2 - PART 2 PRODUCTS (Not Applicable)

PART 3 - PART 3 EXECUTION

3.1 SCHEDULE OF INSPECTING AND TESTING LABORATORY SERVICES:

- A. Scope of testing work is subject to modification at the discretion of the Owner.
- B. Site Testing:
 - 1. The testing firm shall employ a Soils Engineer and Soils Laboratory qualified in soils testing and evaluation to observe site grading, placement of fill, and excavation and backfill for building pad, site drainage system, and site utilities, and perform the activities scheduled below.
 - 2. Analyze native and imported fill and backfill material and topsoil proposed for use to determine suitability for use and compliance with Contract Documents.
 - a. Test fill and backfill material to determine soil classification, plasticity index, optimum moisture content, and dry density.
 - b. After rough grading and prior to spreading of topsoil, test topsoil in lawn areas and topsoil and subgrade in planting beds to determine organic content, acidity and soil composition.
 - 3. Field test natural grades to be retained, areas of cut, and areas of controlled fill or backfill to determine moisture content, percent of compaction and compliance with specified values.
 - a. Number of Tests: Minimum number as scheduled below and additional tests at the discretion of the Soils Engineer.

1. Building Area: One test for every 500 cubic yards of fill and backfill, or in areas of natural grade or cut one test for every 10,000 square feet, located to give equal coverage to all portions of the building subgrade.
2. Paved Areas (Except Trench Excavation): One test for every 2000 cubic yards of fill, or in areas of natural grade or cut one test for every 40,000 square feet.
3. Trench Excavation: One test for every 500 cubic yards or 100 lineal feet of fill or backfill.
4. Observe building subgrade preparation; confirm size, depth, and suitability of the fill areas; test soil bearing capacity to verify compliance with specified values; test porous fill to determine soil classification, depth, and percent of compaction.

END OF SECTION 014520

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SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner Architect, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service: Installation and removal of and use charges for temporary water and sewer for construction purposes shall be included in the contract sum. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service: Installation and removal of and use charges for temporary electric for construction purposes shall be included in the contract sum. Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, tpestyles, graphic elements, and message content.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:

1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
4. Waste-handling procedures.
5. Other dust-control measures.

1.4 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.
- C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to 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 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks.
 2. Conference room of sufficient size to accommodate meetings of 12 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs.
 3. Drinking water.
 4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
 5. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- 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 qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
 - 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 and clean HVAC system as required in Section 017700 "Closeout Procedures."
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 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 until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Temporary 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.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
- G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
- H. 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.
- I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel.
- J. Electronic Communication Service:
 - 1. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall, providing minimum **2.0** Mbps upload and **15** Mbps download speeds at each computer.

3.4 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. 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 areas as indicated on Drawings.
 - 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- 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.
- D. Parking: Provide temporary parking areas for construction personnel.
- 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 or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 3. Maintain and touch up signs so they are legible at all times.
- G. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- K. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- L. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 311000 "Site Clearing."
- D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings, requirements of EPA Construction General Permit and authorities having jurisdiction, whichever is more stringent].
 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- F. Tree and Plant Protection: Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."

- G. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- H. 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. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- I. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
 - 1. Extent of Fence: [As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- J. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- K. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- L. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- M. 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.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- N. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and Tenants from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 3. Provide walk-off mats at each entrance through temporary partition.
- O. 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; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.

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.

3.6 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 3. Indicate methods to be used to avoid trapping water in finished work.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard and replace stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.

2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.7 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. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. 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. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

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SECTION 015713 - TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General and Special Conditions, which are hereby made a part of this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Prevention of erosion due to construction activities.
 - 2. Prevention of sedimentation of waterways, open drainage ways, and storm and due to construction activities.
 - 3. Restoration of areas eroded due to insufficient preventive measures.
 - 4. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by contractor.
 - 5. Refer to Site SWPPP drawings.

1.03 RELATED SECTIONS

- A. Section 311000 - Site Clearing: Limits on clearing; disposition of vegetative clearing debris.
- B. Section 312200 - Grading: Temporary and permanent grade changes for erosion control.
- C. Section 321216 – Asphalt Paving: Temporary and permanent roadways.
- D. Section 329200 - Turf and Grasses

1.04 REFERENCES

- A. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; current edition;
<http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>.
- B. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control; Federal Highway Administration; 1995.
- C. USDA TR-55 - Urban Hydrology for Small Watersheds; USDA Natural Resources Conservation Service; 1996.
- D. ODNR: Rainwater and Land Development Manual 2006 Third Edition.

1.05 PERFORMANCE REQUIREMENTS

- A. Comply with all requirements of U.S. Environmental Protection Agency for erosion and sedimentation control, as specified for the National Pollutant Discharge Elimination System (NPDES), Phases I and II, under requirements for the 2003 Construction General Permit (CGP), whether the project is required by law to comply or not.
- B. Also comply with all more stringent requirements of Miami County Soil & Water Conservation District standards.
- C. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.
- D. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
 - 1. Prevent runoff into storm sewers, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
- E. Erosion on Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
 - 1. Control movement of sediment and soil from temporary stockpiles of soil.
 - 2. Prevent development of ruts due to equipment and vehicular traffic.
- F. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
 - 1. Prevent windblown soil from leaving the project site.
 - 2. Prevent tracking of mud onto public roads outside site.
 - 3. Prevent mud and sediment from flowing onto sidewalks and pavements.
 - 4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- G. Sedimentation of Waterways on Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
 - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
 - 2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment as necessary after any storm.
- H. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
 - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
- I. Open Water: Prevent standing water that could become stagnant.

- J. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.06 PERFORMANCE REQUIREMENTS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Erosion and Sedimentation Control Plan:
 - 1. Follow Site SWPPP drawings.
 - 2. Other information required by law.
- C. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.
- D. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.
- E. Maintenance Instructions: Provide instructions covering inspection and maintenance for temporary measures that must remain after Substantial Completion.
- E. Erosion control blanket shall provide a temporary, biodegradable cover material to reduce slope and/or channel erosion and enhance revegetation. Erosion control blanket performance capabilities shall be determined by ASTM D 6459, "Determination of Erosion Control Blanket (ECB) Performance in Protecting Hillslopes from Rainfall-Induced Erosion", and ASTM D 6460, "Determination of Erosion Control Blanket (ECB) Performance in Protecting Earthen Channels from Stormwater-Induced Erosion."

2.01 CLEAN UP

- A. Maintain Existing erosion and sediment control materials.
- B. Inspect temporary measures prior to completion of this project phase and restore all measures to specified condition.
- C. Clean out temporary sediment control structures that are to remain as permanent measures.
- D. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION 015713

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SECTION 016000 - PRODUCT REQUIREMENTS

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. This 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; product substitutions; and comparable products.
- B. See Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
- C. See Divisions 02 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 SUBMITTALS

- A. Comparable Product Requests: Submit three (3) opaque copies or one (1) electronic copy in PDF non-secured file format of each request for consideration. Identify product or fabrication or installation method to be replaced. Identify product conformance with Specifications. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
 - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. 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 ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Store cementitious products and materials on elevated platforms.
 - 5. Store foam plastic away from sunlight exposure, 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.

1.6 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: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to Divisions 2 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that 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 not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed that complies with requirements.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.

9. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 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.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION – CONSTRUCTION LAYOUT/FIELD ENGINEERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Prime Contract, including General and Special Conditions, apply to Work of this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for field engineering services including, but not limited to, the following:
 - 1. Land survey work.
- B. Related Work Specified Elsewhere
 - 1. Section 017700 - Closeout Procedures for recording of Owner accepted deviations from indicated lines and levels.
 - 2. Section 003132 – Geotechnical Data. Reference documents for Geotechnical Data.

1.3 QUALITY ASSURANCE

- A. Coordinate with the Owner's surveying vendor for topographic surveys as indicated.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Identification: The Owner will identify existing control points and property line corner stakes.
- B. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks, before proceeding to lay out the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
 - 1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points or requirements to relocate reference points because of necessary changes in grades or locations.
 - 2. Promptly replace lost or destroyed project control points. Base replacements on the original survey control points.
- C. Establish and maintain a minimum of two permanent benchmarks on the site, referenced to data established by survey control points.
 - 1. Record benchmark locations, with horizontal and vertical data, on project record documents.

- D. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction.

3.2 PERFORMANCE

- A. Work from lines and levels established by the property survey. Establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to locate each element of the project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
 - 1. Advise entities engaged in construction activities of marked lines and levels provided for their use.
- B. Surveyor's Log: Maintain a surveyor's log of control and other survey work. Make this log available for reference.
 - 1. Record deviations from required lines and levels, and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On project record drawings, record deviations that are accepted and not corrected.
- C. Site Improvements: Locate and lay out site improvements, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.

- D. Existing Utilities: Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.

3.3 CONSTRUCTION STAKING, LINES, AND GRADE

- A. The Owner has provided initial controls (horizontal and vertical) as shown on the Drawings. The Contractor shall use these to establish construction controls for the project.
- B. The Contractor shall transfer the line and grade from the controls shown on the Drawings as is necessary to do the work. He shall also be responsible for the preservation of all stakes and marks, as previously established by the Owner.
- C. As it is the Contractor's responsibility to perform the work from the basic control, the Contractor shall, before performing the work, satisfy himself that he has adequate controls to lay out the work for line and grade, and that he fully understands the control as set, in order to insure the completion of the project as per the Drawings. If there are any questions or discrepancies pertaining to the survey work, the Contractor shall immediately notify the Architect for clarification, or for additional control, prior to doing the construction work. For the Contractor to do the work implies that he has complied with this requirement.
- D. The instruments and other equipment used in surveying by the Contractor, as provided in this Section, shall be suitable and maintained in proper condition and adjustment for such use. Such surveying shall be performed by personnel qualified and experienced in such work and under the direct supervision of a licensed surveyor.
- E. The Architect shall not be responsible for transferring grade from controls to locate the elevation of the work.

END OF SECTION 017300

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SECTION 017329 - CUTTING AND PATCHING

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. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. Divisions 02 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. 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.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related 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.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.5 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials 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 match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. 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.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

- 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. 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 as small as possible, neatly to 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 Division 31 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.
- C. 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 possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate 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.
 3. Floors and Walls: Where walls or partitions that are removed extend from 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, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. 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.
 6. Pavement patching or entrance apron tie-in or configuration requirements shall be the responsibility of the contractor and per the governing authority's direction.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

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SECTION 017400 - CONSTRUCTION CLEANING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General and Special Conditions, which are hereby made a part of this Section.

1.02 SUMMARY

- A. Execute final cleaning at completion of the Work, as required by this Section. For Contractor's daily clean-up, dust control and rubbish removal operations during construction, refer to Section 015000 - Temporary Facilities and Controls.

1.03 DISPOSAL REQUIREMENTS

- A. Conduct final cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.
 - 1. Do not burn or bury rubbish and waste materials on Project site.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.

PART 2 SITE CLEAN-UP/RUBBISH REMOVAL PROCEDURES

2.01 PURPOSE

- A. An effective and efficient clean-up procedure on a job site contributes to both the productivity and safety of all those involved. The following requirements are intended to provide a satisfactory and equitable method to manage and accomplish project clean up.

2.02 REQUIREMENTS

- A. Contractor: Shall be responsible for direct, daily, weekly and final clean-up of their work and the work of their subcontractors as defined herein. The cost of this requirement shall be included in the General Contractor's bid. All Subcontractors will be responsible for control of dust generated by their operation and will be responsible for daily area clean up. Roadways must be maintained clear. Use only those cleaning materials which will not create hazards to health or property, and which will not damage surfaces. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned. Sweeping compounds used in cleaning operations shall leave no residue on concrete floor surfaces that may affect installation of finish flooring materials.

- B. Dumpsters: The General Contractor will provide and maintain the job site dumpsters for unidentifiable debris for use as specified below. Each Subcontractor shall be responsible for daily clean up and removal of identifiable debris and waste resulting from their operations. No overfilling of dumpsters will be allowed. All adjacent areas are to be kept clean. Excavation, demolition, masonry, and hazardous waste materials are not to be placed in dumpsters provided by General Contractor. Subcontractor(s) will be responsible for removing their excavation, demolition, masonry, drywall and hazardous waste materials from the site.
1. Contractors must handle materials in a controlled manner in their clean-up or other operations so that dust and other contaminants resulting from the cleaning or disposal process will not affect Owner operations or construction finish operations (i.e. painting, staining, etc.) or fall on wet or newly coated surfaces.
 2. Each Contractor is responsible to leave their work in a clean condition. This includes, but is not limited to, removal of all grease, dust, dirt, stains, labels, fingerprints and other foreign matter. All Contractors will be responsible for control of dust generated by their operation and will be responsible for a daily area clean-up.
- C. Final Clean Up: Final clean up, will be done before punch list inspection or prior to the turning of the project area over to the Owner.
- D. Use of Owner's Facilities: The Owner's facilities are not to be used by any Contractor for the disposal of trash or debris from their work.
- E. Hazardous Waste Materials: Contractors or Subcontractors must dispose of hazardous waste materials in accordance to Federal, State, and Local regulations. They may not be placed in dumpsters and/or containers not so designated.
- F. Failure to perform Clean Up: If any Contractor or Subcontractor fails to maintain a satisfactory clean-up program, the Architect will issue written notice, to those at fault, that the necessary clean-up must be performed within 24 hours after the notice is given. The establishment of a definite deadline for the removal of debris and rubbish will supersede the necessity for any formal notification that such work must be done. If Contractor(s) fail to perform the clean up, by the deadline, the Architect will have the option to perform clean up on the project and back charge the responsible Contractor(s) for the costs.

PART 3 EXECUTION

3.01 FINAL CLEANING

- A. The General Contractor will employ personnel for final cleaning which will consist of the following to a degree of acceptance by the project architect.
1. Broom clean and power wash exterior paved surfaces; rake clean other surfaces of the grounds.

2. Final cleaning is to include mopping (streak free) of all exposed concrete surfaces and hard surfaces, vacuuming of all carpets; dusting/polishing of doors, casework (inside and out), countertops, windowsills; cleaning and polishing of all plumbing fixtures. Final cleaning to include the removal of all glass/window labels and cleaning of the interior and exterior surfaces of all windows, storefronts, and doors. Mechanical/electrical spaces shall be left clean with the removal of all unused construction materials. Paint to be cleaned of scuffs, marks or touched up.
- B. Each Contractor shall be responsible for the following for their work.
1. Prior to final completion, or Owner occupancy, Contractor shall conduct an inspection of all work areas, to verify that the entire Work is left in a broom clean condition.
 2. Clean the entire system of piping and equipment internally. Tanks, fixtures and pumps shall be drained and proved free of sludge and accumulated matter.
 3. Temporary labels, stickers, etc., shall be removed from fixtures and equipment. (Do not remove permanent nameplates, equipment model numbers, ratings, etc.)
 4. Before being placed in service water distribution systems shall be chlorinated.

END OF SECTION 017400

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SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections include the following:
 - 1. Division 01 Section "Temporary Facilities and Controls" for environmental-protection measures during construction and location of waste containers at Project site.

1.2 DEFINITIONS

- A. Construction Waste: Site improvement materials and other solid waste resulting from construction operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- 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.

1.3 PERFORMANCE REQUIREMENTS

- A. Recycle Requirements: Owner's goal is to salvage and recycle as much nonhazardous demolition and construction waste as possible including the following materials:

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, 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. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

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 administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Final cleaning.
 - 4. Repair of the Work.
- B. Related Requirements:
 - 1. Section 017839 "Project Record Documents" for submitting record Drawings.

1.3 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Reports: SWPPP Logs

1.4 SUBSTANTIAL COMPLETION PROCEDURES

- A. 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, damage or settlement surveys, and similar final record information.
- B. 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. Advise Owner of all necessary utility change over requirements.
 - 3. Complete final cleaning requirements.
 - 4. Coordinate topographic survey to be performed by the Owner's surveying vendor to verify final grades.

1.5 FINAL COMPLETION PROCEDURES

- A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
 2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 3. Submit final report on quantities and placement of fill based on final topographic survey.

1.6 FINAL TOPOGRAPHIC SURVEY QUANTITIES

- A. Quantify fill areas based on final survey and areas needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Submit plans to correct areas that do not meet specified grades.
 2. The Owner will not pay for additional fill that exceeds specified grades unless approved by the Owner prior to placement.

PART 2 - PRODUCTS

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.
- a. Clean roject area and adjoining properties disturbed by construction activities of rubbish, waste material, litter, and other foreign substances.
 - b. Clean public roadways.
 - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - d. Leave Project clean and ready for use by the next Contractor.

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Maintenance manuals for the care and maintenance of systems and equipment.
- B. Related Work Specified Elsewhere:
 - 1. Section 017700 – Closeout Procedures: For preparing Record Drawings for operation and maintenance manuals.
 - 2. Divisions 2 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

- A. General: At the time of Contractor's pay application reaches 75 percent complete, each Subcontractor shall submit to the General Contractor 2 copies of a rough draft for a comprehensive Maintenance and Operating Manual presenting complete directions and recommendations for the proper care and maintenance of visible surfaces as well as maintenance and operating instructions for equipment items which he has provided.
 - 1. If the project is being constructed in Phases, provide Maintenance and Operating Manuals at the completion of each Phase of Work.
- B. Final Submittal: Submit one copy of each manual in final form within 30 days of the date draft was reviewed. Architect will return copy with comments within 15 days or approve as submitted.

1. Correct or modify each manual to comply with Architect's comments. Submit (1) hard copy and (1) electronic copy on a storage device of each corrected manual within 15 days of receipt of Architect's comments.
2. Provide a subcontractor/vendor directory with addresses, point-of-contact names with phone numbers for each product/system installed. Include a listing and a physical copy of all warranties (construction and manufacturer).

1.5 COORDINATION

- A. Where operation and maintenance documentation include information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 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 the following materials, in the order listed:
 1. Title page.
 2. Table of contents.

3. 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 Architect.
 7. 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.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
1. Binders: Heavy-duty, 3-ring, 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 to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. 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. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 5. 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.

2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
 2. Emergency instructions.
 3. 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:
1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. 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 the following, as applicable:
1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions.
 2. Performance and design criteria if Contractor is delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.

10. License requirements including inspection and renewal dates.

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 the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identifies color-coding where required for identification.

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.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.

3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training videotape, if available.
- 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.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- 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.
1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. 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.
- 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.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- 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 includes 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.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- 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 017700 – Closeout Procedures for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

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SECTION 017839 - PROJECT RECORD DOCUMENTS

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. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
- B. Related Sections include the following:
 - 1. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 2. Divisions 02 through 33 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one (1) set of marked-up Record Prints.
- B. Record Specifications: Submit one (1) set of Project's Specifications, including addenda and contract modifications.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of white prints of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally
 - a. Accurately record information in an understandable drawing technique.
 - b. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Revisions to details shown on Drawings.
 - b. Locations and depths of underground utilities.
 - c. Revisions to routing of piping.
 - d. Changes made by Change Order or Construction Change Directive.
 - e. Changes made following Architect's written orders.

- f. Details not on the original Contract Drawings.
 - g. Field records for variable and concealed conditions.
 - h. Record information on the Work that is shown only schematically.
 - i. Extensions of design (i.e. sprinkler).
 - j. MEP coordination drawing.
 - k. MEP system layout drawings.
 - l. Labeling schematics and listings.
3. Mark the Contract Drawings.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Identification: As follows:

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

2.3 TOPOGRAPHIC SURVEYS

- A. Topographic surveys of the project site will be completed by the Owner's surveying vendor.
1. Coordinate surveys at intervals indicated.
 2. Prepare quantity variations from survey and original drawing grades and quantities.
- B. miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
- B. Related Work Specified Elsewhere:
 - 1. Divisions 2 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 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.
 - 1. At completion of training, submit one complete training manual for Owner's use.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.
- C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. 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 Architect.

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 by individual Specification Sections, and as follows:
 - 1. Equipment, including food-service equipment.
 - 2. Conveying systems, including elevators.
 - 3. Heat generation, including boilers, feed water equipment, pumps, steam distribution piping, and water distribution piping.
 - 4. Refrigeration systems including chillers, cooling towers, condensers, pumps, and distribution piping.
 - 5. HVAC systems including air-handling equipment, air distribution systems, and terminal equipment and devices.
 - 6. HVAC instrumentation and controls.
 - 7. Electrical service and distribution, including transformers, switchboards, panelboards, uninterruptible power supplies, and motor controls.
 - 8. Packaged engine generators, including transfer switches.
 - 9. Lighting equipment and controls.
 - 10. Communication systems, including intercommunication, surveillance, clocks and programming, voice and data, and television equipment.
- 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 the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.

- h. Performance curves.
2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project Record Documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:

- a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. 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 Contractor with names and positions of participants.
- B. 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 and Architect, through General Contractor, with at least fourteen days advance notice.
- C. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- D. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING RECORDING

- A. The Contractor shall engage a qualified person to video record all demonstration and training sessions. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids on each recording.
 - 1. Each recorded training session shall be provided with an index so that each hour of recording is noted for quick user reference.
- B. Video and Audio Format: Digital Storage Device.

END OF SECTION 017900

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03

CONCRETE

DIVISION

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SECTION 033000 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 Specifications, apply to this Section.

1.2 DESCRIPTION

- A. Basic specification: Perform work of this Section according to ACI 301-16, "Specifications for Structural Concrete", except as specifically modified herein.
- B. Work included: All cast-in-place concrete work shown on the Drawings and required by these Specifications. Allow for the installation of cast-in items furnished under other Sections. Provide and install grout under steel column base plates and beam bearing areas. Provide and install dowels for masonry walls.
- C. Related work specified elsewhere: The general provisions of the Contract apply to the work of this Section, as though reproduced herein. Carefully examine all other Sections and all Drawings for related work such as concrete pads, piers, curbs, and bases required for equipment of all trades. Coordinate dimensions and details of equipment being supplied, prior to placing concrete. Cooperate with other trades who will provide and install items of work (sleeves, piping, conduit, inserts, etc.) to be cast in the concrete. Place no concrete until all such items are in place.

1.3 QUALITY ASSURANCE

- A. Reference standards:
 - 1. ACI 301, Specifications for Structural Concrete
 - 2. ACI 318, Building Code Requirements for Structural Concrete.
 - 3. ACI 117, Specification for Tolerances for Concrete Construction and Materials
 - 4. ACI 347R, Guide to Formwork for Concrete.
 - 5. ACI 302.1R, Guide to Concrete Floor and Slab Construction.
 - 6. "Placing Reinforcing Bars", CRSI & WCRSI Recommended Practices.
 - 7. ACI 439.5R, Comprehensive Guide for the Specification, Manufacture and Construction Use of Welded Wire Reinforcement.
 - 8. ACI 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
 - 9. ACI 305.1, Specification for Hot Weather Concreting.
 - 10. ACI 306R, Guide to Cold Weather Concreting.
 - 11. ACI Field Reference Manual, SP-15.

1.4 SUBMITTALS

- A. Submit a mix design for each type of concrete mix required in accordance with ACI 301, Section 1.5.
 - 1. Acceptable methods of determining concrete proportions shall be in accordance with one of the following methods per ACI 301, Section 4:
 - a. Establish based on previous field strength test data with standard deviation calculations.
 - b. Establish based on trial mixtures with tested strength data relative to each mix design.In either case, provide accurate test data within allowable time periods indicated in ACI 301. Incorrect or missing data will cause for rejection of submittals.
- B. Submit Placing Drawings for all reinforcing. Indicate strength, size, and details of all bar reinforcing, and style and specification of all welded wire fabric. Details must indicate clear cover used to determine chair heights.
- C. Submit shop drawings for all formwork and shoring. Formwork design shall follow the guidelines of ACI 347 and ACI 347.2R. Shop drawings shall indicate sequence of form removal and reshoring for each type of construction. Include minimum concrete strengths for each reshored level at time of form stripping and concrete placement. Provide calculations sealed by a professional engineer registered in the applicable state of project location.
- D. Submit test data for aggregates proposed for use, indicating source and compliance with specification requirements.
- E. Submit product literature for admixtures and curing compounds proposed for use.
- F. Submit product literature on all proprietary materials including joint systems, sealers, and patching compounds.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cement: Portland Cement, ASTM C150, Type I or Type II or ASTM C1157, Type LH or GU. All cement to be from the same mill.
- B. Supplementary Cementitious Materials
 - 1. Fly Ash: ASTM C618, Type C or F
 - 2. Ground Granulated Blast-Furnace Slag, GGBF Slag: ASTM C989, Grade 100 or 120
 - 3. Silica Fume, Microsilica: ASTM C1240
- C. Water: Potable.
- D. Aggregates:
 - 1. Normal weight aggregates: conform to ASTM C33, (4.2.1.2).

2. Coarse aggregate:
 - a. All classes: Gradation #57.

- E. Admixtures, where required or permitted per ACI 301, Section 4:
 1. Water-Reducing: ASTM C494, Type A or D.
 2. Mid-Range Water-Reducing admixture: ASTM C494, Type A.
 3. Air-entraining: ASTM C260 (4.2.1.4).
 4. High-Range Water-Reducing admixture (Superplasticizer): ASTM C494, Type F or G.
 5. Non-Chloride, Non-Corrosive accelerator: ASTM C494, Type C or E.
 6. Fly Ash: ASTM C618, Type C or F.
 7. Ground Granulated Blast-Furnace Slag, GGBF Slag: ASTM C989.
 8. Calcium Chloride and admixtures containing more than 0.06% chloride ions are NOT permitted.
 9. Use of admixtures other than those listed will be permitted only when approved prior to bid.

- F. Reinforcing:
 1. Deformed bars - Uncoated: ASTM A615 or A706. Minimum yield strength to be 60 ksi.
 2. Welded Wire Fabric:
 - a. Plain welded wire reinforcement: ASTM A1064. Provide in sheet form for all uses other than slabs-on-grade. Minimum yield strength is to be 65 ksi.
 - b. Lap sheets a minimum distance of cross wire spacing plus two inches.
 3. Deformed joint dowel bars: ASTM A615, Grade 60, plain steel bars, cut true to length with square ends.
 4. Reinforcing support accessories:
 - a. Provide reinforcement accessories, consisting of bar supports, spacers, hangers, chairs, ties, and similar items as required for spacing, assembling, and supporting reinforcement in place. Conform with CRSI RB4.1 and Manual of Standard Practice and the following requirements:
 - b. For footings and slabs on grade, provide supports with precast concrete or mortar bases or plates or horizontal runners where wetted base materials will not support chair legs.

- G. Premolded expansion joint filler: ASTM D1751.

- H. Curing and Sealing Compound (VOC Compliant, 350 g/l): Liquid type membrane-forming curing compound, clear styrene acrylate type complying with ASTM C1315, Type I, Class B, 25% solids content minimum. Moisture loss shall be not more than 0.40 kg/m² when applied at 300 ft²/gal. Manufacturers' certification is required. Do not apply to surfaces that are to receive subsequent cementitious toppings, sealers, hardeners, ceramic tile resilient flooring, vinylbacked carpet, wood, terrazzo, epoxy or urethane overlays or adhesives, or other coating or finishing products. Subject to project requirements, provide one from the following manufacturers:
 1. BASF Construction Chemicals.
 2. Euclid Chemical Company.
 3. W.R. Meadows

- I. Curing Compound (Strippable): The compound shall conform to ASTM C309 and is to be used on slabs that are to receive subsequent applied finishes and where noted on the drawings. Install in strict accordance with the manufacturer's recommendations and supervision. Verify compound is compatible with the applied finish prior to placement. Subject to project requirements, provide one from the following manufacturers:
1. BASF Construction Chemicals.
 2. Euclid Chemical Company.
 3. W.R. Meadows
- J. Curing compound for the parking area slabs on grade: ASTM C1315, Type 1, Class A, and AASHTO M148. Compound must contain a fugitive dye. Subject to project requirements, provide one from the following manufacturers:
1. BASF Construction Chemicals.
 2. Euclid Chemical Company.
 3. W.R. Meadows.
- K. Grout for masonry core fill: ASTM C476, coarse type.
- L. Grout under steel base plates and bearing plates: Non-shrinking, non-metallic, with minimum 28-day strength of 5,000 psi, when mixed to a fluid consistency. Subject to project requirements, provide one from the following manufacturers:
1. BASF Construction Chemicals.
 2. Euclid Chemical Company.
 3. Kaufman Company.
- M. Vapor Retarder:
1. Conform to ASTM E1745 "Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs", Class A.
 2. Vapor retarders are required under all slabs on grade which are to receive moisture-sensitive floor covering, and in humidity-controlled areas.
 3. Vapor retarder shall be installed in accordance with ASTM E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs. The vapor retarder/barrier shall be a minimum of 10 mils thick and placed directly on the granular fill, below the concrete floor slab. Lap joints a minimum of 6 inches and seal with manufacturer's recommended tape or adhesive.
- N. Granular fill below slabs on grade: Provide as recommended in project specific soils report. If soils report is not provided for project, use 4" deep of compacted ODOT 304 or approved equivalent AASHTO dense graded base course. Provide ASTM D448 size #57 stone under slabs-on-grade where radon evacuation is anticipated.
- O. Curing sheets for wet curing – the following materials are approved:
1. Sisalcraft Sk-10 (C171).
 2. Burlap
 3. Filter Fabric (8-ounce minimum)
 4. Visqueen plastic, 8 mils minimum.
 5. Bur-lene curing blankets.

2.2 MIXES

A. The following mixes of concrete are required:

| Mix Usage | f'c at 28 days | Exposure Class | Maximum Water Cementitious Ratio | Air Content |
|--|----------------|----------------|----------------------------------|-------------|
| Lean Concrete, & Mud Slabs | 1,500 PSI | F0 | --- | --- |
| Footings & Interior Column Piers | 3,500 PSI | F1 | 0.55 | optional |
| Interior Slabs on Grade | 3,500 PSI | F0 | 0.50 | optional |
| Interior Slabs on Grade Which Receive Moisture-Sensitive Floor Coverings | 4,000 PSI | F0 | 0.45 | optional |
| Exterior Foundation Stem Walls, Foundation Walls, & Exterior Column Piers | 4,500 PSI | F2, C1 | 0.45 | 5%-7% |
| Exterior, Unreinforced Slabs on Grade and Exterior Concrete Not Subjected to Deicers | 4,500 PSI | F2, C1 | 0.45 | 5%-7% |

Concrete Mix Notes:

- 1) Exposure class requirements are achieved through the F'c, w/cm, and air content requirements provided to ensure adequate durability conforms to Freeze/Thaw exposures (F) or Corrosive exposures (C).
- 2) For all slab mixes, provide a minimum cementitious content of 520 lbs.
- 3) Slump: Maximum 5" for all members. If a superplasticizer is used, initial slump to be 3", increased to 8" maximum after addition (at the job site) of the superplasticizer.
- 4) Fly ash is permitted in all mixes but shall not exceed 25% of cement weight indicated above and can be included in the water-to-cementitious ratio.
- 5) Ground granulated blast-furnace slag is permitted in all mixes but shall not exceed 35% of the cement weight indicated above and can be included in the water-to-cementitious ratio.
- 6) Silica fume (microsilica) is permitted in all mixes but shall not exceed 10% of the cement weight indicated above and can be included in the water-to-cementitious ratio.
- 7) Total supplemental cementitious material shall not exceed 35% of the total cement weight.
- 8) Mixes to be pumped are to be so identified on the mix design submittal. All pumped mixes are to have a mid-range or high-range water reducer.
- 9) Concrete for slabs on grade must include a mid-range or high-range plasticizer.
- 10) All admixtures (other than superplasticizer) are to be added at the batch plant. Superplasticizers, designed for addition to the mix at the plant, may be added at the batch plant with verification from the Engineer of Record and verification that the water-to-cement ratio has not been exceeded.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Verify that excavations are free of water and ice, are of the required dimensions, and have been approved by the Soils Engineer, prior to placing concrete.
- B. Determine field conditions by actual measurement.
- C. Notify Architect not less than 24 hours in advance of placing concrete. waived.

3.2 FORMWORK AND REINFORCING

- A. All formwork shall follow the guidelines of ACI 347R resulting in final formed surfaces within the tolerances of ACI 117.
- B. Footings may be cast against earth cuts when soil conditions permit.
- C. Removal of forms and shoring:
 - 1. Remove no forms within 24 hours after placement.
- D. Reinforcing:
 - 1. Welding of reinforcing is prohibited, except where shown.

3.3 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 all embeds shown on contract documents, including but not limited to:
 - anchor bolts.
 - 2. Install sleeves for mechanical, electrical, and plumbing penetrations.
- B. Aluminum conduit shall not be installed in concrete.

3.4 DELIVERY AND PLACEMENT

- A. Preparation before placement:
 - 1. Remove all debris from forms and deck. Clean steel deck of grease, oil, and other substances that would reduce bond to concrete.
 - 2. Standing water shall be removed from place of deposit before concrete is placed.
 - 3. Do not use additives or salts to remove ice. Non-chloride deicers may be used.
 - 4. In cold weather, comply with ACI 306R; maintain temperature of forms and reinforcing within a range of 55 - 90 degrees F.
 - 5. In hot weather, comply with ACI 305.1.
- B. Delivery is to conform to ASTM C94.

1. Delivery tickets to contain the following, in addition to the information required by C94:
 2. Reading of revolution counter at first addition of water.
 3. Type and brand of cement and supplementary cementitious materials.
 4. Cementitious content.
 5. Total water content by producer.
 6. Maximum size of aggregate.
 7. Secure Architect's written approval if non-agitating type equipment is to be used for transportation.
 8. ASTM C94 requires discharge within 1-1/2 hours or 300 revolutions; whichever comes first, after the introduction of water to cement and aggregates, or the introduction of cement to the aggregates. Architect may require an earlier discharge during hot weather, or when high-early strength cement is being used.
- C. Water addition at the site will not be permitted, except when the approved mix design has been formulated to allow for on-site addition of water. Water may only be added by personnel authorized by the Architect/Engineer and Concrete Producer.
- D. Conveying: Keep delivery carts and buggies on runways; do not allow them to bear on reinforcing or uncured concrete.
- E. Placement.
 1. Place within 6 feet of final position. Spreading with vibrators is prohibited.
 2. Maximum free fall without chutes or elephant trunks to be 5 feet (3 feet for architectural concrete).
 3. Place concrete continuously to a designed joint such that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of cold joints or planes of weakness.
 4. Concrete shall be consolidated per guidelines in ACI 309.2R.
- F. Records: Keep a complete log of pours, including date, location, quantity, weather, and identification of test cylinders for each pour.

3.5 JOINTING

- A. Interior slabs on grade:
 1. Locate control (contraction) joints as shown on the Drawings. In the absence of information on Drawings, locate at openings, walls, columns, grid lines, and inside corners. The maximum spacing of contraction (control) joints, for reinforced and unreinforced slabs, is to be 6 times the square root of the slab thickness (i.e. for a 4-inch slab the maximum spacing is 12 feet). Cut joints $\frac{1}{4}$ times the slab thickness. The Soff-Cut Saw shall be used immediately after final finishing. A conventional saw shall be used as soon as possible without dislodging aggregate. Schedule slab pours and saw-cutting operations such that sawing is completed prior to onset of shrinkage cracking.
 2. Provide isolation joints at columns ($\frac{1}{2}$ inch thick) and at walls ($\frac{1}{8}$ inch thick). Where isolation joint will be exposed to view, set top of joint filler below top of slab a distance equal to the filler thickness, to receive sealant. Where not exposed to view, set top of filler flush with top of slab.

- B. Exterior slabs on grade: Locate joints as shown on Drawings. In the absence of information on Drawings, provide the following (for sidewalks only):
 - 1. Expansion joints: Full depth, with ½ inch joint filler, where slabs abut vertical surfaces at intersections of sidewalks, at abrupt changes in width, and at a spacing not exceeding 30 feet.
 - 2. Control joints: Tooled, 1 inch deep, 4'-0" to 6'-0" on center between expansion joints.

3.6 FINISHES

- A. Schedule of finishes on flatwork per ACI 301, section 5 is as follows:
 - 1. Typical interior floor areas to receive carpet, resilient floor covering, or to remain exposed - troweled finish.
 - 2. Interior floor areas to receive terrazzo, quarry tile, or ceramic tile - floated finish.
 - 3. Exterior slabs - broom finish.
- B. Surfaces of floor slabs shall be finished to the following tolerances, per ACI 117:
 - 1. Minimum flatness of F(f) 30, and a minimum levelness of F(l) 20, are required for typical slabs on grade. Preceding values are average values to be obtained over a given area. Minimum local values (one-half bay) of F(f) 25 and F(l) 17 shall be obtained.
 - 2. Minimum flatness of F(f) 25 is required for elevated slabs. Preceding value is an average value to be obtained over a given area. Minimum local value (one-half bay) of F(f) 20 shall be obtained.
- C. Determination of the flatness and levelness of a concrete slab shall be made on the day following placement of the first concrete pour. Tests shall be made in accordance with ASTM E115. After it is established that proper procedures are being utilized to obtain the desired results, flatness/levelness test shall be performed only as directed by the Owner.
- D. Any bay not conforming to the above flatness and levelness requirements is subject to: repair, or removal; replacement; and retesting; at no expense to the Owner.
- E. "F Numbers" shall be submitted to the Owner and Architect immediately after they are determined by the testing laboratory.

3.7 CURING AND PROTECTION

- A. Curing:
 - 1. Interior slab areas that will receive non-moisture sensitive terrazzo, ceramic tile, quarry tile, or a liquid sealer/densifier, are to be moist-cured for a minimum of 7 days, without the use of a curing compound.
 - 2. Interior slab on grade areas which will receive moisture sensitive floor coverings are to be cured with plastic sheeting, conforming to ASTM C171, for 7 days. Edges and joints are to be sealed. Rewetting of the slab at any time during construction should be avoided.
 - 3. All other slab areas which will receive non-moisture sensitive floor coverings may be either moist-cured or receive an application of curing compound, except

that when concrete above grade is placed in the open, and the air temperature exceeds 60 °F, the concrete is to be moist-cured for the first 24 hours.

4. Whichever curing method is used, it is to commence immediately after placement. Do not allow curing to be delayed overnight.
 5. Prevent excessive moisture loss from formed surfaces. If forms are removed before 7 days have elapsed, cure the formed surfaces by moist-curing or application of curing compound for the remainder of the curing period.
- B. Protection:
1. When air temperature during placement is less than 40 °F, or will be within 24 hours, temperature of concrete as placed is to be between 50 °F and 90 °F (55 °F and 90 °F for sections less than 12 inches thick) and a non-chloride accelerator shall be used. Maintain concrete temperature within these limits for the full curing period of 7 days.
 2. When air temperature during placement is greater than 80 degrees, a water-reducing retarder shall be used. 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.

3.8 CLEANING AND REPAIR

- A. Repair any slabs that do not meet the finish requirements. The Architect will determine whether grinding, filling of cracks, or patching and leveling procedures are required.
- B. For slabs that are dusting, or showing other signs of improper curing, any corrective measures attempted will be subject to prior approval of the Architect and will be performed at Contractor's expense. These may include additional applications of sealer/densifier, or grinding, or covering with specified repair topping.
- C. Immediately prior to final acceptance, remove from all interior and exterior surfaces that are exposed to view, any stain-producing elements, such as pyrites, nail, wire, reinforcing steel, and form ties.
- D. Remove all stains completely. Use of weak acids or patented cleaners is acceptable, but surface is to be completely neutralized after use.
- E. All repairs shall conform to ACI 301, Section 5.3.7 except that the specified bonding compounds, cementitious, or epoxy repair materials must be used. Repair procedures must be submitted and reviewed by the Engineer of Record.

3.9 ACCEPTANCE

- A. Concrete work with serious honeycombing, form misalignment, or other deviation from Contract requirements is subject to rejection per ACI 301, Section 1.
- B. When observations or tests indicate that the Contract requirements have not been met, the Contractor is to bear the costs of any additional testing and analysis to determine

acceptability and also the cost of removal and replacement, if such is required per ACI 301, Section 1.

3.10 FIELD QUALITY CONTROL

- A. Inspection and testing shall be in accordance with Special Inspections designated for this project as approved by the Building Official. Special Inspections must be documented with all corrective measures completed to satisfy compliance certificates as deemed necessary by the jurisdiction.
- B. All tests and inspection shall be per ACI 301, Section 1.6

END OF SECTION 03 30 00

04

MASONRY

DIVISION

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SECTION 040523 – MASONRY ACCESSORIES

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. Reinforcing bars.
2. Masonry joint reinforcement.
3. Masonry ties.
4. Masonry anchors.
5. Masonry joints.
6. Embedded masonry flashing.
7. Column isolation.
8. Caging devices and centering clips.
9. Weep vents.
10. Mortar stop.
11. Grout screen.
12. Thermal break.
13. Bond breaker strips.
14. Masonry cleaners.

- B. Related Sections:

1. Division 04 Section "Unit Masonry" for all unit masonry types.
2. Division 04 Section "Cast Stone Masonry".

1.3 DEFINITIONS

- A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: For the following:

1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."

2. Prefabricated/Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Verification: For each type and color of the following:
1. Weep holes and vents.
 2. Accessories embedded in masonry.
 3. All accessories for cavity-wall construction, especially all flashing materials.
- D. List of Materials Used in Constructing Mockups: 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.
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.

1.5 QUALITY ASSURANCE

- A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents. Comply with applicable requirements established by UL and other governing authorities for designated fire resistance classifications.
- B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Observation and evaluation of mock-up shall be by the masonry installer, general trades contractor, A/E, CM, OSFC-PA, Commissioning Agent, window installer, testing agency, and air barrier certifier.
1. Build mock-up of typical wall area(s) as shown on Drawings including Movement Control Joints (Sealant Filled) 1'4" (minimum length), Air Barrier, Blocking for Window, Horizontal and Vertical Reinforcing Shelf Angles and Supports, Bond Beams and Lintels, Brick Ties and Anchors Flashing, End Dams, Weeps and Vents, Cavity Drainage Material (if required), Window Head, Sill and Jamb Details.
 - 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).
 - d. Include CMU back-up, cavity insulation, veneer anchors, flashing, cavity drainage material, weep holes/vents, and all masonry accessories in exterior masonry-veneer wall mockup, including shelve angles, lintels, bond beams.
 - e. Include one example of each type of masonry accessory used.
 - f. Mock-up shall include a complete through –wall penetration by each trade contractor including fire protection, plumbing, mechanical and electrical.
 2. The window contractor shall provide and install in the mock-up wall a sample window of the type and profile used. (leaving portions of the perimeter exposed for inspection of the

- fasteners and air barrier transition to the masonry; some portions to receive final caulking inside and out)
3. Prior to starting general masonry cleaning, prepare mock-up for cleaning using the same cleaning materials and methods proposed for the Work.
 4. Protect accepted mock-ups from the elements with weather-resistant membrane.
 5. The construction of the mock-up shall be photographed or videotaped by the masonry contractor to be part of a presentation for groups of trades people as they join the project work force.

- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products manufactured by Hohmann & Barnard, Inc. or a comparable product by one of the following, unless noted otherwise:
1. Hohmann & Barnard, Inc.
 2. Dayton Superior Corporation, Dur-O-Wal Division.
 3. Heckmann Building Products Inc.

2.2 REINFORCING BARS

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.
1. Size, length, and spacing shall be as indicated.
 2. Use #3 spacer bars at 48-inch spacing connected to longitudinal reinforcing bars in concrete masonry bond beams to hold bars in proper location.

2.3 MASONRY JOINT REINFORCEMENT

- A. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
1. Interior Walls: Hot-dip galvanized, carbon steel.
 2. Exterior Walls: Hot-dip galvanized, carbon steel.
 3. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

- B. Masonry Joint Reinforcement for Single-wythe Masonry: Provide ladder type joint reinforcing fabricated with two 9-gauge steel side rods and 9-gauge cross rods. Joint reinforcing shall be placed in every other CMU joint or not more than 16 inches o.c. (Hohmann & Barnard, Inc.; #220 Ladder Mesh).
- C. Masonry Joint Reinforcement for Multi-wythe Masonry: Provide ladder type joint reinforcing fabricated with two 9-gauge steel side rods and 9-gauge cross rods. Joint reinforcing shall be placed in every other CMU joint or not more than 16 inches o.c. (Hohmann & Barnard, Inc.; #240 Ladder-Twin-Mesh)
- D. Masonry Joint Reinforcement for Insulated Cavity Walls:
 - 1. When both wythes are to be constructed simultaneously:
 - a. Provide ladder type joint reinforcing fabricated with three 9-gauge steel side rods and 9-gauge cross rods. Joint reinforcing shall be placed in every other CMU joint or not more than 16-inches o.c. (Hohmann & Barnard, Inc.; #235 Cavity Ladder-Tri-Mesh)
 - 2. When each wythe is to be constructed separately:
 - a. Provide adjustable ladder type joint reinforcing fabricated with two 9-gauge steel side rods, 9-gauge cross rods, 3/16-inch eyes and 3/16-inch double legged pintles. Longitudinal rods shall be spaced for each face shell of CMU; eye sections shall extend into wall cavity, and pintles shall rest upon bed joints of face brick. Joint reinforcing shall be placed in every other CMU joint or not more than 16 inches o.c. (Hohmann & Barnard, Inc.; #270 S.I.S. Ladder Eye-Wire with Seismiclip® Interlock System)
 - 3. For multi-wythe walls in which the coursing in the face wythe does not align vertically with the coursing in the backup wythe (Hohmann & Barnard, Inc.; Tie – HVR - 295V Anchor System – Ladder Type).
- E. Masonry Joint Reinforcement for Foundation Walls consisting of Two Wythes of CMU: Provide ladder type joint reinforcing fabricated with four 9-gauge steel side rods and 9-gauge cross rods. Joint reinforcing shall be placed in every CMU joint or no more than 8 inches o.c. Side rods shall align with face shells of CMU (Hohmann & Barnard, Inc.; #240 Ladder-Twin-Mesh).
- F. Masonry Joint Reinforcement for Single-wythe Foundation Walls: Provide ladder type joint reinforcing fabricated with two 9-gauge steel side rods and 9-gauge cross rods. Joint reinforcing shall be placed in every CMU joint or no more than 8-inches o.c. (Hohmann & Barnard, Inc.; #220 Ladder Mesh).
- G. Masonry Joint Reinforcement for Composite Walls Consisting of Two Wythes of CMU: Provide ladder type reinforced with four 9-gauge steel side rods and 9-gauge cross wires. Side rods should align with face shells of CMU. Joint reinforcing shall be placed in every other CMU joint or no more than 16-inches on center (Hohmann & Barnard, Inc.; #240 Ladder-Twin-Mesh).
- H. Intersecting Masonry Wall Joint Reinforcing: Horizontal bed joint reinforcement for conditions where masonry walls supported on slabs intersect masonry walls supported on footings at 90 degrees shall be stabilization anchors (Hohmann & Barnard, Inc.; Slip Set Stabilizer).
- I. All ladder type joint reinforcing shall have cross rods spaced at 16-inches o.c.

2.4 MASONRY TIES

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
 3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Adjustable Wall Ties: (**Hohmann & Barnard, Inc. Thermal 2-Seal Wing Nut Anchor**). Barrel (Stainless Steel) ASTM A580/A580M – AISI Type 304, Screw (Carbon Steel) ASTM A510/ASTM C954, Wire (Carbon Steel) Prefabricated from cold-drawn steel wire conforming to ASTM A1064/A1064M

2.5 MASONRY ANCHORS

- A. Rigid Anchors: Where masonry is to be rigidly anchored to structural steel beams, provide galvanized steel straps, bars and rods welded to the steel beam and extending into the mortar joint. Straps shall not be less than 14-gauge in thickness. Bars and rods shall be not less than ¼ inch diameter.
- B. Flexible Anchors: Where masonry is to be laterally supported from structural steel, while permitting only vertical movement or both vertical and horizontal movement, provide flexible anchors consisting of 2 different components as follows:
1. Weld-On Anchors: Shall be formed straps of 12-gauge hot-dip galvanized steel or formed rods of 1/4-inch plain steel with 3/8-inch offsets and 4-inch adjustments for ties specified below. Anchors shall be continuous wherever possible.
 2. Flexible Anchor Ties
 - a. Web Ties or Beam Ties shall be 3/16-inch hot-dip galvanized steel wire, ASTM A82, 12-inches long with width being approximately 2-inches less than normal wall thickness. Provide ties with blunt end when used with strap anchors. This type tie shall permit only vertical movement and shall be installed parallel to masonry walls that abut steel columns (Hohmann & Barnard, Inc.; 359 or 359-C Weld on Anchors with 301W Web Ties, or 359F or 359F-C Weld on Anchors with 302W Web Ties).
 - b. Triangular Ties: Shall be 3/16-inch galvanized steel wire, ASTM A82, lengths as required to extend to within 5/8-inch of opposite face of masonry. Closed end shall be 1-inch wide, and split-end opening shall be ½-inch. This type tie shall permit both vertical and horizontal movement and shall be installed where masonry by-passes steel columns, and where masonry is parallel and adjacent to steel beams and joists.
 - c. Flexible Anchors: Where masonry is to be laterally supported from cast-in-place or precast concrete, provide 22-gauge galvanized dovetail slots with 3/16-inch diameter hot-dip galvanized triangular ties.
- C. Dowels on Lintels: Where masonry is supported on the top of lintels and plates, provide #4 reinforcing bar by 6-inch or ½-inch diameter by 6-inch headed studs at 16-inch spacing, unless

otherwise noted, welded to top of steel and extending into cores or cavity of masonry above. Grout entire first course above lintel.

- D. Stabilization Anchors: Provide where masonry walls intersect concrete or existing masonry walls (Hohmann & Barnard, Inc.; Slip Set Stabilizer).
- E. Partition Top anchors: 0.105-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. Anchor Bolts: Headed or L-shaped 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.
- G. Adhesive Anchor Bolts
 - 1. Subject to compliance with requirements, provide products manufactured by one of the following:
 - a. Hilti, Inc.
 - b. Imperial Supplies LLC.
 - c. ITW Red Head
 - d. Simpson Strong-Tie Company, Inc.
 - 2. In hollow CMU - Adhesive anchor systems with nylon or stainless-steel screen inserts. Use 3/4-inch diameter anchors with 6-inch embedment, unless otherwise noted.
 - 3. In solid grouted CMU - Adhesive anchor systems. Use 3/4-inch diameter anchors with 6-inch embedment; unless otherwise noted (minimum allowable shear 2600 pounds; minimum allowable tension 2000 pounds/anchor).
- H. Stainless Steel Stone Anchors: Where stone units are to be rigidly anchored to structural elements or to masonry walls. Stainless steel shapes are dimensioned and detailed in the drawings.

2.6 MASONRY JOINTS

- A. Expansion Joint
 - 1. Provide expansion joints with neoprene filler in exterior brick masonry conforming to ASTM D-1056 where indicated on the Drawings (Hohmann & Barnard, Inc.; #NS-Closed Cell Neoprene Sponge).
- B. Control Joint
 - 1. Provide PVC control joints designed for standard sash block in CMU walls where control joints (CJ) are indicated and as specified in Section 04200 – Unit Masonry (Hohmann & Barnard, Inc.; VS-Standard).

2.7 EMBEDDED MASONRY FLASHING

A. Flexible Through Wall Flashing (not exposed to exterior)

1. Composite Membrane Flashing: 40-mil thick composite membrane with adhesive factory laminated to polyethylene sheeting. Flashing is backed with removable release paper and will not run when exposed to UV or heat. (Hohmann & Barnard, Inc.; Textroflash).
 - a. Accessories
 - 1) Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer. All inside and outside corners shall be stainless steel produced by flashing manufacturer.
 - 2) Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed. Install in all locations where flashing is exposed to exterior (Hohmann & Barnard, Inc.; DP).
 - 3) Attach all flashing by insertion into CMU joints. Surface termination bar attachments not permitted unless indicated on the Drawings.

B. Custom Fabricated Stepped Flashing

1. Stainless steel stepped flashing as detailed in the drawings.
2. Shop fabricated by cutting, braking, and soldering to form stainless steel to dimensions and shapes indicated, or as manufactured to match the dimensions and shapes indicated.

2.8 COLUMN ISOLATION

A. Around all columns in masonry walls, provide 3/8-inch expansion joint filler.

1. Subject to compliance with requirements, provide products manufactured by one of the following:
 - a. APS Supply Company, Inc. – Closed Cell Poly Foam.
 - b. Williams Products, Inc. – Econ-O-Foam.
 - c. W.R. Meadows, Inc. - Ceramar Flexible-Foam.

2.9 CAGING DEVICES AND CENTERING CLIPS

- ### A. In hollow concrete masonry cores and brick cavities to be reinforced with vertical reinforcing steel bars and filled with grout, provide 9-gauge hot-dip galvanized steel caging devices (Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner).

2.10 WEEP VENTS

- ### A. 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 (Hohmann & Barnard, Inc.; Quadro-Vent).

2.11 MORTAR STOP

- A. Free-draining mesh; made from high density polyethylene or nylon strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe (Hohmann & Barnard, Inc.; Mortar Net).

2.12 GROUT SCREEN

- A. Screening material to isolate the flow of grout; made from high strength, non-corrosive polypropylene polymers that does not interfere with mortar strength (Hohmann & Barnard, Inc.; MGS – Mortar/Grout Screen).

2.13 THERMAL BREAK

- A. Where indicated in masonry walls, provide ½-inch expansion joint filler.
 - 1. Subject to compliance with requirements, provide products manufactured by one of the following:
 - a. APS Supply Company, Inc. – Closed Cell Poly Foam.
 - b. Williams Products, Inc. – Econ-O-Foam.
 - c. W.R. Meadows, Inc. - Ceramar Flexible-Foam.
 - 2. Confirm that joint locations of all masonry are per Architect's direction or as shown on Drawings. Mock-up should contain control joint with selected sealant.

2.14 BOND-BREAKER STRIPS

- A. Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

2.15 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.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Section 042000 UNIT MASONRY for installation of masonry accessories specified under this section.

END OF SECTION 040523

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SECTION 042000 - UNIT MASONRY

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. This Section includes unit masonry assemblies consisting of the following:
 - 1. Concrete masonry units.
 - 2. Masonry Lintels.
 - 3. Face Brick
 - 4. Mortar and grout materials.
 - 5. Mortar and grout mixes.
- B. Related Sections include the following:
 - 1. Division 04 Section "Masonry Accessories" for materials to be installed under this Section.
 - 2. Division 04 Section "Cast Stone Masonry" for materials to be installed under this Section.
 - 3. Division 05 Section "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.
 - 4. Division 07 Section "Sheet Metal Flashing and Trim" for furnishing manufactured reglets installed in masonry joints for metal flashing.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement.
- C. Samples for each type and color of exposed masonry units and mortars.
- D. Material Certificates: For each type of product indicated. Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards.

1. For masonry units include material test reports substantiating compliance with requirements.

E. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1.5 QUALITY ASSURANCE

A. 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, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

D. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. The Owner will make Payment for these services.

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, according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 185 for air content.

4. Grout Test (Compressive Strength): For each mix required, per ASTM C 1019.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Observation and evaluation of mock-up shall be by the masonry installer, general trades contractor, A/E, CM, OSFC-PA, Commissioning Agent, window installer, testing agency, and air barrier certifier.

1. Build mock-up of typical wall area(s) as shown on Drawings including Movement Control Joints (Sealant Filled) 1'4" (minimum length), Air Barrier, Blocking for Window, Horizontal and Vertical Reinforcing Shelf Angles and Supports, Bond Beams and Lintels, Brick Ties and Anchors Flashing, End Dams, Weeps and Vents, Cavity Drainage Material (if required), Window Head, Sill and Jamb Details.

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).

d. Include CMU back-up, cavity insulation, veneer anchors, flashing, cavity drainage material, weep holes/vents, and all masonry accessories in exterior masonry-veneer wall mockup, including shelf angles, lintels, bond beams.

- e. Include one example of each type of masonry accessory used.
 - f. Mock-up shall include a complete through-wall penetration by each trade contractor including fire protection, plumbing, mechanical and electrical.
2. The window contractor shall provide and install in the mock-up wall a sample window of the type and profile used in the classrooms. (leaving portions of the perimeter exposed for inspection of the fasteners and air barrier transition to the masonry; some portions to receive final caulking inside and out)
 3. Prior to starting general masonry cleaning, prepare mock-up for cleaning using the same cleaning materials and methods proposed for the Work.
 4. Protect accepted mock-ups from the elements with weather-resistant membrane.
 5. The construction of the mock-up shall be photographed or videotaped by the masonry contractor to be part of a presentation for groups of trades people as they join the project work force.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

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. Deliver pre-blended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store pre-blended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.
- C. 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 of walls and hold cover securely in place.
 2. Where one 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 three 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 higher and will remain so until masonry has dried, but not less than seven 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 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.
1. All concrete masonry units in fire rated partitions shall be equal to UL Classification D-2 (2 hour) unless indicated otherwise.
- C. Reference Standards:
1. ASTM C33, Standard Specification for Concrete Aggregates.
 2. ASTM C90, Standard Specification for Load Bearing Concrete Masonry Units.
 3. ASTM C423, Standard Test Methods for Sound Absorption and Sound Absorption Coefficients.

2.2 CONCRETE MASONRY UNITS

- A. Regional Materials: Provide CMUs that have been manufactured within 500 miles of Project site from aggregate and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

- B. Manufacturer: The concrete block manufacturer shall be a member of the National Concrete Masonry Association.
- C. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
- D. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide bullnose units for outside corners and windowsills unless otherwise indicated.
- E. Integral Water Repellent: Provide liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen. Provide in all units exposed to the exterior.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. W.R. Grace & Co.; Dry-Block.
 - b. BASF Construction Chemical; Rheapel Plus.
 - c. Addiment Inc.; Block Plus W-10.
- F. CMUs General: ASTM C 90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi.
 - 2. Density Classification: Normal weight.
 - 3. Color: Uncolored.

2.3 MASONRY LINTELS

- A. General: Provide one of the following:
- B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 FACE BRICK

- A. Regional Materials: Provide brick that has been manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- B. Face Brick:
 - 1. Facing brick complying with ASTM C 216.
 - 2. Grade: SW.
 - 3. Type: FBX or FBS.

4. Unit Compressive Strength: Provide units with minimum average gross-area compressive strength of 3000 psi.
5. Size: (Actual dimensions)
 - a. 3 ½ inches wide by 2 ¼ inches high by 7 ½ inches long. – or –
 - b. 3 ⅝ inches wide by 2 ¼ inches high by 7 ⅝ inches long.
6. Efflorescence: ASTM C67, 'non effloresced'.
7. Manufacturers: Subject to compliance with requirements, provide products from one of the following:
 - a. Belden Brick Company.
 - b. Redland Brick Inc.
 - c. Glen-Gery Brick.
8. Colors: To be selected by Architect/Owner.
 - a. Bidders to use allowance of \$625.00 per 1000 for bidding purposes.

2.5 MORTAR AND GROUT MATERIALS

- A. Regional Materials: Provide aggregate for mortar and grout, cement, and lime that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- B. 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. Use Type I only in grout.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- E. Masonry Cement: ASTM C 91.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cemex S.A.B. de C.V.; Brikset Type N.
 - b. Holcim (US) Inc.; Mortamix Masonry Cement.
 - c. Lafarge North America Inc.; Magnolia Masonry Cement.
 - d. Lehigh Cement Company; Lehigh Masonry Cement.
- F. Mortar Cement: ASTM C 1329.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Essroc Cement Corp.; Bixment Mortar Cement.
 - b. Holcim (US) Inc.; Rainbow Mortamix Mortar Cement.
 - c. Lafarge North America Inc.; Magnolia Superbond Mortar Cement.
- G. Aggregate for Mortar: ASTM C 144.

- H. Aggregate for Grout: ASTM C 404.
- I. 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: Subject to compliance with requirements, provide one of the following:
 - a. Euclid Chemical Company (The); Accelguard 80.
 - b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
 - c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.
- J. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent by same manufacturer.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. W.R. Grace & Co.; Dry-Block.
 - b. Master Builders, Inc.; Rheopel.
 - c. Addiment Inc.; Block Plus W-10.
- K. Water: Potable.

2.6 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, 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. Use portland cement-lime, masonry cement, or mortar cement mortar unless otherwise indicated.
 - 3. 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, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
 - 1. For masonry below grade or in contact with earth, use Type S.
 - 2. For reinforced masonry, use Type N.
 - 3. 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.
 - 4. For interior non-load-bearing partitions, Type N.
- D. 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. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2500 psi.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

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 the 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. 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.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2-inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. 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.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. 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.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. 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.
7. 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.

C. Joints:

1. For 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.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. 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.
5. 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.

3.4 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 CMUs 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. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section "Penetration Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay face 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.

3.6 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 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 on center 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, 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.
 - c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align.
 - 3. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.
- B. 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.

3.7 MASONRY JOINT REINFORCEMENT

- A. General: Install in mortar with a minimum cover of 1/2 inch. 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 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 corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL

- 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 inch in width between masonry and structural member, unless otherwise indicated.
 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 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and masonry backup with masonry-veneer anchors to comply with the following requirements:
 1. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 2. Space anchors as indicated, but not more than 16 inches o.c. vertically and 24 inches o.c. horizontally with not less than 1 anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches around perimeter.

3.10 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 as follows:
 1. Install preformed control-joint gaskets designed to fit standard sash block.
- C. Form expansion joints in brick as follows:

1. 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.

3.11 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry 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.
- D. Provide sealant at all lintel bearing-points for smooth finished appearance of both steel and masonry lintels and shelf angles.

3.12 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 as recommended by flashing manufacturer.
 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and to within 1/2 inch of the interior face of wall.
 3. 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.
 4. At locations indicated on the Drawings, install custom fabricated stainless steel flashing units to form watertight installations. Flashing dimensions and formations as indicated.
 5. Install stainless steel drip edges beneath flexible flashing at exterior face of wall. Extend flexible flashing 2 inches (minimum) beyond outside face of wall and adhere flexible flashing to top of metal drip edge. Cut flashing off flush with outside face of wall after observation of conditions is completed by the Architect.
- C. Install reglets and nailers for flashing and other related construction where shown to be built into the masonry.

- D. 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.
 - 2. Space weep holes 24 inches o/c, unless otherwise indicated.
- E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Division 04 Section "Masonry Accessories."
- F. 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.

3.13 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 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 48 inches.

3.14 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Level 1 special inspections according to the "International Building Code."
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

3. Place grout only after inspectors have verified proportions of site-prepared grout.
- 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, according to ASTM C 67 for compressive strength.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

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 nonmasonry 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. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Crush masonry waste to less than 4 inches in each dimension.
 - 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 31 Section "Earth Moving."
 - 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. 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 042000

SECTION 047200 - CAST STONE MASONRY

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. This Section includes the following:
 - 1. Cast stone trim, including the following:
 - a. Windowsills.
 - b. Lintels.
 - c. Wall caps.
 - d. Belt courses.
- B. Related Sections include the following:
 - 1. Division 04 Section "Masonry Accessories" for cast stone installation.
 - 2. Division 04 Section "Unit Masonry" for installing cast stone units in unit masonry.

1.3 DEFINITIONS

- A. Cast Stone: Architectural precast concrete building units intended to simulate natural cut stone.

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for cast stone units.
- B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
 - 1. Include building elevations showing layout of units and locations of joints and anchors.
- C. Samples for Verification:
 - 1. For each color and texture of cast stone required, 10 inches square in size.
- D. Qualification Data: For manufacturer.

1. Include copies of material test reports for completed projects, indicating compliance of cast stone with ASTM C 1364.

1.5 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute.
- B. **Source Limitations for Cast Stone:** Obtain cast stone units through single source from single manufacturer.
- C. **Mockups:** Furnish cast stone for installation in mockups specified in Division 04 Section "Unit Masonry".
- D. **Preinstallation Conference:** Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone with unit masonry work to minimize the need for on-site storage and to avoid delaying the Work.
- B. Pack, handle, and ship cast stone units in suitable packs or pallets.
 1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
 2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

1.7 PROJECT CONDITIONS

- A. **Cold-Weather Requirements:** Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements 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 cast stone has dried, but no fewer than seven days after completing cleaning.
- B. **Hot-Weather Requirements:** Comply with hot-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 CAST STONE MATERIALS

- A. General: Comply with ASTM C 1364 and the following:
- B. Portland Cement: ASTM C 150, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114. Provide natural color or white cement as required to produce cast stone color indicated.
- C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33; gradation and colors as needed to produce required cast stone textures and colors.
- D. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33, gradation and colors as needed to produce required cast stone textures and colors.
- E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- F. Admixtures: Use only admixtures specified or approved in writing by Architect.
 - 1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
 - 2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
 - 3. Air-Entraining Admixture: ASTM C 260. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
 - 4. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 5. Water-Reducing, Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 6. Water-Reducing, Accelerating Admixture: ASTM C 494/C 494M, Type E.
- G. Reinforcement: Deformed steel bars complying with ASTM A 615/A 615M, Grade 60. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches of cast stone material.
 - 1. Epoxy Coating: ASTM A 775/A 775M.
 - 2. Galvanized Coating: ASTM A 767/A 767M.
- H. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666, Type 304.

2.2 CAST STONE UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Architectural Ornamental Castings, Inc.
 - 2. Edwards Cast Stone Co.
 - 3. Monumental Stone Works, Inc.

4. Palm Beach Cast Stone.
 5. York Lintel & Cast Stone, Inc.
- B. Provide cast stone units complying with ASTM C 1364 using the vibrant dry tamp or wet-cast method.
1. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666, Procedure A, as modified by ASTM C 1364, or are made from cast stone that has a history of successful resistance to freezing and thawing.
- C. Fabricate units with sharp arris and details accurately reproduced with indicated texture on all exposed surfaces, unless otherwise indicated.
1. Slope exposed horizontal surfaces 1:12, unless otherwise indicated.
 2. Provide raised fillets at backs of sills and at ends to be built into jambs.
 3. Provide drips on projecting elements, unless otherwise indicated.
- D. Fabrication Tolerances:
1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
 2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch whichever is greater, but in no case by more than 1/4 inch
 3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch whichever is greater.
 4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.
- E. Cure units as follows:
1. Cure units in enclosed moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
 2. Keep units damp and continue curing to comply with one of the following:
 - a. No fewer than five days at mean daily temperature of 70 deg F or above.
 - b. No fewer than six days at mean daily temperature of 60 deg F or above.
 - c. No fewer than seven days at mean daily temperature of 50 deg F or above.
 - d. No fewer than eight days at mean daily temperature of 45 deg F or above.
- F. Acid etch units after curing to remove cement film from surfaces to be exposed to view.
- G. Colors and Textures: Selected by Architect from manufacturer's full range.

2.3 MORTAR MATERIALS

- A. Provide mortar materials that comply with Division 04 Section "Unit Masonry."
- B. Regional Materials: Provide aggregate for mortar and grout, cement, and lime that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

2.4 ACCESSORIES

- A. Anchors: Type and size indicated, fabricated from stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666, Type 304.
- B. Cementitious Dampproofing: Cementitious formulations that are recommended by cast stone manufacturer and that are nonstaining to cast stone, compatible with joint sealants, and noncorrosive to veneer anchors and attachments.

2.5 MORTAR MIXES

- A. Comply with requirements in Division 04 Section "Unit Masonry" for mortar mixes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of cast stone.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING CAST STONE IN MORTAR

- A. Install cast stone units to comply with requirements in Division 04 Section "Unit Masonry."
- B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
 - 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
- C. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- D. Set units in full bed of mortar with full head joints, unless otherwise indicated.
 - 1. If not indicated, set units with joints 1/4 to 3/8 inch wide.
 - 2. Build anchors and ties into mortar joints as units are set.
 - 3. Fill dowel holes and anchor slots with mortar.
 - 4. Fill collar joints solid as units are set.
 - 5. Build concealed flashing into mortar joints as units are set.
 - 6. Keep head joints in coping and other units with exposed horizontal surfaces open to receive sealant.
 - 7. Keep joints at shelf angles open to receive sealant.
- E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

- F. Provide sealant joints at copings and other horizontal surfaces, at expansion, control, and pressure-relieving joints, and at locations indicated.
 - 1. Keep joints free of mortar and other rigid materials.
 - 2. Build in compressible foam-plastic joint fillers where indicated.
 - 3. Form joint of width indicated, but not less than 3/8 inch.
 - 4. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
 - 5. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Division 07 Section "Joint Sealants."

3.3 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as specified in Division 04 Section "Unit Masonry".

END OF SECTION 047200

05

METALS

DIVISION

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SECTION 051200 – STRUCTURAL STEEL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provision of the Contract, including General and Supplementary Conditions and Division 01 Specifications, apply to this Section.

1.02 DESCRIPTION

- A. Work included: All labor and materials required to furnish and install the structural steel work shown on the Drawings and required by these Specifications, including that shown on mechanical or electrical Drawings, or required in their specification Sections.
- B. Related works specified elsewhere: The general provisions of the Contract apply to the work of this Section, as though reproduced herein. Carefully examine all other Sections and all Drawings for related work.
- C. Work furnished but installed under other Sections: Anchor bolts.
- D. Work affected by others: Mechanical framing, loads, openings, and structure in any way related to mechanical requirements is shown for bidding purposes only. Responsibility for coordinating the work of this Section with these requirements is solely that of the Contractor. Contractor's review of shop drawings will be taken to indicate that this coordination has been accomplished.
- E. Inspection and testing required by this Section to be at Owner's expense.

1.03 QUALITY ASSURANCE

- A. Reference standards:
 - 1. By the American Institute of Steel Construction (AISC):
 - a. Specification for Structural Steel Buildings.
 - b. Specification for Structural Joints Using ASTM A325 or A490 bolts.
 - c. Code of Standard Practice for Steel Buildings and Bridges.
 - d. Seismic Provisions for Structural Steel Buildings and Supplement No.2.
 - 2. By the American Welding Society (ANSI/AWS):
 - a. Structural Welding Code-Steel (D1.1).
 - b. Symbols for Welding and Non-Destructive Testing (A2.4).
- B. Fabricator's qualifications:
 - 1. Minimum five years' continuous experience in the fabrication of steel for projects of similar quality and scope.
- C. Erector's qualifications: Minimum five years' continuous experience in similar steel erection.

- D. Welders' qualifications: Personnel and procedures are to be qualified in accordance with ANSI/AWS D1.1.
- E. Inspection agency's qualifications: Minimum three years' experience in similar steel inspection, and approval of the Architect.

1.04 SUBMITTALS

- A. Certification of experience: Submit, on request only, written description of personnel, projects, and equipment which document the experience and qualifications required of the fabricator, erector, welders, and inspection agency.
- B. Shop drawings: Provide dimensioned erection plans with appropriate sections and details, including member piece details that include the following:
 - 1. Indicate all shop and erection details, including cuts, copes, cambers, connections, holes, threaded fastener types, sizes and lengths, washers, and weld types, sizes and lengths.
 - 2. Include embedment layout drawings.
 - 3. Indicate material specifications and finishes.
 - 4. Indicate shop and field welds with symbols per ANSI/AWS A2.4.
- C. Inspection reports: Submit reports for the inspection specified.

1.05 PRODUCT DELIVERY AND STORAGE

- A. Delivery:
 - 1. Comply with ASTM A6. Non-compliance will be cause for rejection.
 - 2. Deliver anchor bolts and other items to be embedded in cast-in-place concrete or masonry prior to the start of that work. Provide setting drawings, templates, or instructions required for the installation of such items.
- B. Storage:
 - 1. Store steel at site above ground on platforms, skids, or other supports.
 - 2. Protect steel from corrosion.
 - 3. Store packaged materials in their original unbroken packages.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Structural steel wide flange shapes:
 - 1. $F_y=50$ ksi steel: ASTM A992 or ASTM A572.
- B. Structural steel channels, angles, plates, bars, etc.:
 - 1. $F_y=36$ ksi steel: ASTM A36.
- C. Structural steel tubing:
 - 1. $F_y=35$ ksi round steel tubing: ASTM A53, Type E or S, Grade B.
 - 2. $F_y=46$ ksi square and rectangular HSS: ASTM A500, Grade B.

- D. Anchor Bolts, standard bolts and nuts: ASTM A307. Provide heavy washers for anchor bolts.
- E. High strength threaded fasteners: ASTM A325 or A490.
- F. Expansion Anchors:
 - 1. Wedge anchors shall have a one-piece anchor body with an expansion mechanism of interlocking wedges. Carbon steel components shall be zinc plated according to ASTM B633, galvanized according to ASTM B695, or stainless steel conforming to ASTM A276 or ASTM A493 of material meeting AISI 304 or 316. The following are acceptable:
 - a. Kwik Bolt III by Hilti Fastening Systems
 - b. Wedge-All by Simpson Strong-Tie Anchors
 - c. Rawl-Stud by Rawlplug Company
- G. Welding electrodes: Conform to requirements of ANSI/AWS D.1, using Series E70 electrodes, appropriate for the materials being welded.
- H. Shop paint primer:
 - 1. Interior exposure: SSPC Paint 25, or Federal Specification TT-P-636c, or TT-P-31c.
 - 2. Primer is to be compatible with finish paint.

2.02 FABRICATION

- A. Conform to applicable provisions of the reference standards listed in Part 1 of this Section, as modified herein.
- B. Connection design:
 - 1. Connection type is to be:
 - a. Snug-tight unless noted otherwise.
 - 2. Connection details on Drawings are to illustrate location, type, the general arrangement only, and to establish minimum requirements.
 - 3. Shop connections may be welded or bolted, unless shown otherwise.
 - 4. Field connections shall be bolted, unless shown otherwise.
 - 5. Standard bolts and nuts are permitted only for connections of secondary members, unless noted otherwise. High strength threaded fasteners are required for all other bolted connections.
- C. Finishing: Ends of members in direct contact bearing, such as columns at their bases and splices, are to be “finished”, as defined in the Code of Standard Practice.
- D. Bearing and base plates: Column base plates are to be shop attached. Beam bearing plates may be attached or loose.
- E. Holes: Drill or punch holes in members as required for passage of conduit and piping, and attachment of joists, nailers, etc. Burning such holes is not permitted. If opening is not shown on structural drawings, obtain prior approval.

- F. Cleaning:
 - 1. Remove oil, dirt, loose mill scale, or other material that would impair welding.
 - 2. For steel that is to be painted, cleaning techniques are to be as required by the appropriate SSPC paint specification.
- G. Shop painting: Steel not exposed to view in the finished structure need not be painted. Steel exposed to view, except that to be galvanized, is to be painted as follows:
 - 1. Other interior exposure: Apply one-coat shop paint system in accordance with SSPC-PS 7.01. Apply two coats to surfaces inaccessible after assembly.
 - 2. Do not paint surfaces to be field welded.
- H. Galvanizing: Where required, galvanizing is to conform to ASTM A153. Except for bolts, nuts, and anchors, all galvanizing is to be done after fabrication.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Prior to beginning work of this Section, verify that the installed work of other trades is complete and correct to the extent necessary for the proper execution of the work of this Section. This includes locations of anchor bolts, and lines and grades of bearing areas.
- B. In the event of discrepancies, immediately notify the Architect. Do not proceed with work affected by the discrepancies until they have been resolved.

3.02 ERECTION

- A. Conform to the applicable provisions of the reference standards listed in Part 1 of this Section, as modified herein.
- B. This structure is designed to be self-supporting and stable after the building is fully completed. It is solely the Contractor's responsibility to determine erection procedure and sequence; and to ensure the stability of the building and its component parts, and of the adequacy of temporary or incomplete connections, during erection. This includes the addition or whatever temporary bracing, guys, or tie-downs that might be necessary. Such material is not shown on the Drawings. If applied, they shall be removed as conditions permit, and shall remain the Contractor's property.
- C. Safety: It is solely the Contractor's responsibility to follow all applicable safety codes and regulations governing this work.
- D. Clean bearing surfaces and other surfaces in permanent contact, prior to assembly.
- E. Splices are permitted only where indicated.
- F. Tolerances: Per AISC Code of Standard Practice.
- G. Field corrections of fabrication errors by gas cutting is not permitted in major members without prior approval of the Architect.

- H. Welds that are subject to foot traffic or are exposed to view in the finished structure are to be ground smooth and flush with adjacent surfaces.
- I. Touch-up painting: After erection, touch-up field connections and abrasions in the shop coat with same paint used for shop coat. Do not paint welds until they have been cleaned in accordance with AWS D1.1.

3.03 FIELD QUALITY CONTROL

- A. Inspection agency shall perform the following:
 - 1. Review qualifications of welders, operators, and welding procedures submitted by the Contractor.
 - 2. Review materials' proofs of compliance, if such are required.
 - 3. Inspect bolted connections, including pre-installation verification testing when required, per the requirements of the AISC Specification for Structural Joints.
- B. Inspection agency shall be directly responsible to the Architect.

END OF SECTION

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SECTION 053100 – METAL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications, apply to this section.

1.2 DESCRIPTION

- A. Work included: All labor and materials required to furnish and install metal decking and accessories including closures, hanger tabs, edge filler plates, ridge and valley plates, end enclosure angles, and roof sump pans were shown on the Drawings and or required for a complete installation.
- B. Related work specified elsewhere: The general provisions of the Contract apply to the work of this Section, as though reproduced herein. Carefully examine all other sections and all Drawings for related work.

1.3 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Specification for the Design of Cold-Formed steel Structural Members, current edition, by the American Iron and Steel Institute.
 - 2. Design Manual for Floor Decks and Roof Decks, by the Steel Deck Institute (SDI)
- B. Manufacturer's qualifications: Regularly engaged in the manufacture of similar decking.
- C. Erector's qualifications: Minimum five years' experience in installation of similar decking.
- D. Welder's qualifications: Personnel and procedures are to be qualified per the requirements of the American Welding Society as given in AWS D1.1.

1.4 SUBMITTALS

- A. Certification of experience: Submit, on request only, written description of personnel, projects, and equipment which document the experience and qualifications required of the manufacturer, erector, and welders.
- B. Shop Drawings:
 - 1. Provide a deck placement plan that indicates mark, number, type, finish, dimensions, and location of deck units. Include details and locations of sump pans, openings, and all accessories.
 - 2. Indicated method of attachment to supporting members.

3. Indicate details and installation instructions for all types of decking and all accessories.
 4. Indicate sequence of installation, where critical.
- C. Manufacturer's Certification:
1. Certify compliance with structural criteria. Published load tables and literature are usually acceptable. Provide design calculations on request only.
 2. Certify compliance with finish criteria with test reports as required.
 3. Furnish evidence of listing in Underwriter's Laboratory for the specified U.L. Design Assembly.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Prevent damage to deck or finish during delivery, handling, and storage. Store on blocking or platforms, off the ground, with one end elevated for drainage.
- B. Protect from rusting with waterproof covering, or storage under roof. Follow manufacturer's instructions for storage and protection of deck surfaces that are not painted or galvanized.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

- A. Metal Form Deck (Conform/Centering):
 1. Type: 9/16 inches deep, 22 ga. Minimum, wide rib, corrugated.
 2. Finish: Galvanized.

2.2 MATERIALS AND FINISHES:

- A. Materials: Steel sheet conforming to ASTM A653 or A611 with minimum yield strength of 33 ksi.
- B. Finishes:
 1. Galvanized: Conform to ASTM A653, G60.
- C. Accessories: Same material and finish as deck units.
- D. Field touch-up paint:
 1. For galvanized deck: use zinc chromate paint.

2.3 FABRICATION

- A. Units are to be continuous over at least three spans, where possible. Where units are single or double-span, use heavier gauge if required for stress or deflection control. End laps are to occur over supports.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Prior to beginning work of this Section, verify that the installed work of other trades is complete and correct to the extent necessary for the proper execution of the work of this Section.
- B. In the event of discrepancies, immediately notify the Architect. Do not proceed with work affected by the discrepancies until they have been resolved.

3.2 ERECTION

- A. Install decking in accordance with approved Placement Drawings.
- B. Tolerance: Align adjacent units with 1/4 inch in 40 feet.
- C. Attach metal deck to supports as indicated in the Structural Drawings.
- D. Sidelap Fastening: Method as recommended by manufacturer. Spacing not to exceed 3-feet.
- E. Hanging Loads: Do not hang items other than suspended ceilings from the underside of metal decks, unless specifically approved by the Architect.
- F. Construction Loads:
 - 1. Do not use deck as storage or working platform until it has been permanently attached to supports. Assure that construction loads do not exceed the carrying capacity of the deck.
- G. Repair and Touch-up:
 - 1. At areas where deck will be exposed to view, remove and replace any units with damage or defect that cannot be concealed by painting.
 - 2. Where deck will not be exposed to view, repair any cuts and holes with plate of same gauge as deck.
 - 3. Touch-up all damaged areas of finish, on both top and bottom sides of deck.

3.3 FIELD QUALITY CONTROL

- A. Inspection and testing shall be in accordance with Special Inspections designated for this project as approved by the Building Official. Special Inspections must be documented with all corrective measures completed to satisfy compliance certificates as deemed necessary by the Jurisdiction.

END OF SECTION

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SECTION 054000 – COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.2 DESCRIPTION

- A. Work included: All labor and materials required to furnish and install cold-formed metal framing as shown on the Drawings and or required by these specifications. Cold-formed metal framing includes:
 - 1. Interior and Exterior load-bearing wall studs and framing.
 - 2. Exterior non-load-bearing curtain-wall and soffit framing.
 - 3. Floor joists.
 - 4. Shear walls.
 - 5. Related accessories and necessary fasteners to complete the system.
- B. Related work specified elsewhere: The general provisions of the Contract apply to the work of this Section, as though reproduced herein. Carefully examine all other sections and all Drawings for related work.
- C. Provide openings and special framing required by other trades. Equipment framing, loads, openings, and structure are shown for bidding purposes only. Obtain approval of other trades before proceeding with such work. Coordinate work with mechanical and electrical requirements.
- D. Field measurement of the existing construction shall be conducted when required to ensure the proper coordination and fit of new work.

1.3 QUALITY ASSURANCE

- A. Standards: Comply with American Iron and Steel Institute (AISI) “Specifications for the Design of Cold-Formed Structural Steel Members”, except as otherwise indicated.
 - 1. The minimum uncoated thickness of the cold-formed metal framing delivered to the project shall not be less than 95% of the design thickness indicated. Lesser thicknesses shall be permitted at the bends due to cold forming.
- B. Welding of CFMF: Comply with American Welding Society, AWS D1.1 “Structural Welding Code – Steel” and AWS D1.3 “Structural Welding Code – Sheet Steel”. Qualify welding processes and welding operators in accordance with AWS “Standard Qualification Procedure”.

- C. Fire-rated assemblies: Where work is indicated to comply with fire-resistance ratings, provide materials and installations identical to applicable tested and listed components and assemblies.
- D. Provide each type of cold-formed metal framing required produced by one manufacturer.
- E. Reference Standards:
 - 1. American Society for Testing and Materials (ASTM):
 - a. ASTM A653 “Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot-Dip Process”.
 - b. ASTM A780 “Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings”.
 - c. ASTM A924 “Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process”.
 - d. ASTM A1003 “Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members”.
 - e. ASTM C955 “Standard Specification for Load bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Board and Metal Plaster Bases”.
 - f. ASTM C1007 “Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories”.
 - 2. American Welding Society (AWS):
 - a. AWS A2.4 “Symbols for Welding and Nondestructive Testing”.
 - b. AWS D1.1 “Structural Welding Code-Steel”.
 - c. AWS D1.3 “Structural Welding Code – Sheet Steel”.
 - 3. Association of Wall and Ceiling Industries-International (AWCI) and Metal Lath/Steel Framing Association (ML/SFA)
 - a. AWCI-ML/SFA “Steel Framing Systems Manual”.

1.4 SUBMITTALS

- A. Submit Manufacturer’s product data and installation instructions for each type of cold-formed metal framing and accessory required.
- B. Shop Drawings: submit drawings for approval that include the following minimum information:
 - 1. Fully dimensioned plans and elevations with cross sections and details depicting all component member locations, orientations, and layout.
 - 2. Wall and Floor member sizes and gauge designations, number, type and spacing.
 - 3. Supplemental strapping, bracing, bridging accessories, and details required for proper installation.
 - 4. Details of connections that indicate screw types, quantities, locations, weld size and locations, and any other fastener requirements.
- C. Supplier’s Certification:
 - 1. The supplier of the cold-formed metal framing shall submit written evidence of having a minimum of five years’ experience on projects of similar type and scope, including a description of physical facilities, quality control, methods, personnel experience, and erection capacities.

2. Cold-formed pre-engineered steel truss manufacturer must adhere to Special Inspection requirements for fabricated items.
- D. Welding of cold-formed metal components shall only be performed by operators qualified per AWS D1.1 and D1.3 for the thickness of materials being used. Submit copies of welder certificates upon request only.
- E. Upon request only, submit mill certificates from the steel producer.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturers unopened containers or bundles fully identified by name, brand, type, and grade. Exercise care to avoid damage during unloading, storing, and erection.
- B. Protect cold-formed metal framing members and accessories from corrosion, deformation, damage, and deterioration when stored at the job site as required in AISI's Code of Standard Practice. Store cold-formed metal framing off the ground on pallets, platforms or other supports, and provide a waterproof covering. Keep cold-formed metal framing free of dirt and other foreign material.

1.6 PROJECT CONDITIONS

- A. Coordinate metal frame positioning with trades furnishing items for attachment of built-in members.
- B. Promptly furnish anchors, bolts, inserts, clips, and other items required under this section but built in with work of other trades.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Cold-formed metal framing products by the following manufacturers are approved for use on this project: ClarkDietrich Metal Framing; Marino Ware, a division of Ware Industries; United Metal Products, Inc.; Scafco Corp.; and The Steel Network, Inc.
- B. Connection component and fastener products by the following manufacturers are approved for use on the project: ClarkDietrich Metal Framing; Marino Ware, a division of Ware Industries; and The Steel Network Inc.
- C. Alternate manufacturers of cold-formed metal framing, connection components, and fasteners are to be submitted for review and approval two weeks before submitting bids.

2.2 MATERIALS AND FINISHES:

- A. Steel sheet: ASTM 1003, Structural Grade, Type H, metallic coated, of thickness and grade as follows:
1. 33 mils – 0.0346 inches (20 gauge), $F_y = 33$ ksi.
 2. 43 mils – 0.0451 inches (18 gauge), $F_y = 33$ ksi.
 3. 54 mils – 0.0566 inches (16 gauge), $F_y = 50$ ksi.
 4. 68 mils – 0.0713 inches (14 gauge), $F_y = 50$ ksi.
 5. 97 mils – 0.1017 inches (12 gauge), $F_y = 50$ ksi.
 6. Track and bridging components shall have a minimum $F_y = 33$ ksi.
 7. Connection clip angles and vertical or horizontal deflection connections shall have a minimum $F_y = 33$ ksi.
- B. Framing Components: Manufacturer's standard C-shaped cold-formed metal framing having punched and/or un-punched webs with stiffened flanges shall comply with ASTM C955. Provide sizes, shapes, and gauges indicated. Nomenclature used on the Drawings is designated by: Depth, Shape, Width, and Thickness of framing components. i.e. "600 S162-54".
1. Depth: The number represents the depth of the member multiplied by 100 and expressed as a whole number in inches. i.e. '362' = 3-5/8"; 600' = 6"; '800' = 8".
 2. Shape: 'S' = C-shaped member; 'T' = Track member; 'F' = Furring channel; 'U' = U-shaped member.
 3. Width: The number represents the flange width of the member multiplied by 100 and expressed as a whole number in inches. i.e. '162' = 1-5/8"; '200' = 2"; 250 = 2-1/2".
 4. Thickness: Expressed in mils as defined above.
- C. System Accessories: Provide manufacture's standard steel tracks, bridging, blocking, clip angles, reinforcements, stiffeners, fasteners, braces, and accessories for each type of cold-formed metal framing required. Provide all components recommended by the manufacturer for the applications indicated and as needed to provide a complete metal framing system.
- D. Finish:
1. Galvanized: Provide framing components: studs, joists, rafters, and headers with protective zinc coating complying with ASTM A1003, minimum G60 coating.
 2. Provide connection components; clip angles, deflection angles, joist hangers, hurricane ties, holdowns, etc. with protective zinc coating complying with ASTM A1003, minimum G90 coating.
 3. Galvanized repair paint: Tnemec Co., Inc. – No. 92 "Tneme-Zinc"; SSPC-Paint 20; or an approved equal zinc-rich primer paint.
- E. Fasteners:
1. Manufacturer's recommended self-drilling, self-tapping screws, bolts, nuts, and washers with hot-dip galvanized finish complying with ASTM C1513.
 2. Anchorage devices: Power-actuated Fasteners (PAF), anchor rods, drilled expansion anchors, or chemical anchors.
 3. Welding: Comply with AWS D1.1 when applicable, and AWS D1.3 for welding base materials less than 1/8" thick.
- F. Shims: Load-bearing, high-density multimonomer plastic, non-leaching.

2.3 FABRICATION

- A. Cut framing to fit squarely against abutting members. Hold members securely in position until properly fastened.
- B. Saw cut all field cuts of cold-formed metal framing members and components squarely for attachment to perpendicular members, or as required for an angular fit against abutting members.
- C. Attach and join indicated components by welding. Attach and join other components by welding, bolting, or screw fasteners as recommended by the manufacturer. Wire-tying of framing members is not permitted.

PART 3 - EXECUTION

3.1 INSTALLATION – GENERAL

- A. Install cold-formed metal framing in accordance with ASTM C1007 unless otherwise indicated.
- B. Install load bearing shims or grout between underside of wall bottom track or rim track and top of foundation wall or slab at studs or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.
- C. Install cold-formed metal framing and accessories plumb, square, and true to line according to the manufacturer's written recommendations and requirements in this Section.
- D. Connections of cold-formed metal framing members and components are to be securely anchored to the supporting structure according to the manufacturer's written recommendations and requirements of this Section.
- E. Do not bridge building expansion joints and control joints with cold-formed metal framing members or accessories. Frame each side of joints with independent members.
- F. Install insulation in assemblies and built-up members in exterior framing, such as headers, multiple stud columns and jambs, sills, and boxed beams or joists that are not accessible to the insulation contractor upon erection of framing work.
- G. Fasten hole-reinforcing plates over web penetrations that exceed the manufacturer's standard punched openings.

3.2 INSTALLATION – INTERIOR AND EXTERIOR LOAD BEARING STUD WALLS

- A. Install continuous top and bottom tracks sized to match studs. Align tracks securely to layout at base and top of studs. Secure tracks at corners, ends, and laps as recommended by the manufacturer for type of construction involved. Anchor tracks to building framing as recommended by the manufacturer except do not exceed 16 inches on center spacing

- for nail or power actuated fasteners, or 32 inches on center for anchor rods, expansion and chemical anchors, and other similar types of attachment.
- B. Set studs plumb except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
 - C. Where stud systems abut structural columns or walls, including masonry walls, anchor ends of stiffeners to supporting structure.
 - D. Install supplementary framing, blocking and bracing in cold-formed metal framing systems wherever required to provide a complete and stable wall-framing system. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight for loading resulting from item supported.
 - E. Squarely set studs against web of tracks and secure studs to top and bottom runner tracks by either welding or fastening with screws at both inside and outside flanges.
 - F. Install stud wall bridging (continuous cold-rolled channels positioned through the stud punch-outs) either by welding directly to the stud or attaching with clips. Bridging shall consist of the following:
 - 1. 3-5/8" and 6" studs: 1-1/2" x 16-ga. channel fastened to each stud with standard clip angles.
 - 2. Proprietary bridging bars provided and installed according to manufacturer's written instructions.
 - 3. A combination of flat, taut, steel straps of width and thickness indicated and stud-track solid blocking of width and thickness to match stud. Fasten straps to stud flanges and secure solid blocking to stud webs or flanges with standard clip angles.
 - 4. Install bridging rows at a maximum spacing of 4'-0" on center.
 - G. Frame wall openings larger than 2'-0" square with double stud at each jamb of frame, except where more than 2 studs are shown. Provide stud or joist header at all rough openings greater than 24 inches. Install tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated.
 - H. Provide extra studs, tracks, headers, etc. as required to frame the perimeter of openings.
 - I. Provide insulation, as indicated elsewhere, in all double jamb studs, double header members, and other assemblies that will not be accessible to the insulation contractor after erection.
 - J. Splicing of load-bearing studs and box headers is not permitted, unless specifically detailed otherwise.

3.3 INSTALLATION – JOISTS

- A. Install joists directly over and aligned with studs or install a load distribution member at the top track.
- B. Set joists and rafters straight, square, plumb, and set joists level except as otherwise shown on the Construction Drawings.
- C. Provide web stiffeners at ends, bearing points, concentrated loads above, and where indicated on the Shop Drawings.
- D. Install joist bridging consisting of solid track blocking secured to the joist webs at intervals indicated:
 - 1. Spans 0 to 7 feet: none required.
 - 2. Spans 7 to 14 feet: one row at mid-span.
 - 3. Spans 14 to 20 feet: two rows at third points.
 - 4. Spans 20 to 26 feet: three rows at quarter points.
- E. Install a perimeter track, sized to match the joist depth, at the ends of the members or install blocking between joists at interior supports along the length of the member. Align and securely fasten the tracks or blocking to supporting structure at interior and exterior supports, corners, ends, and at spacing indicated on the Shop Drawings.
- F. Install additional joist under parallel partitions when the partition length exceeds one-half the joist span, and around all floor and roof openings that interrupt one or more joists, unless noted otherwise.
- G. Install miscellaneous joist framing, connections, reinforcing, closure pieces, clip angles, hold-down anchors, and fasteners to provide a complete and stable joist or rafter framing assembly.

3.4 TOLERANCES

- A. Fabricate and install members and assemblies to a maximum allowable variation as follows:
 - 1. Variation from plumb, level, and true to line: 1/8 inch in 10 feet.
 - 2. Variation of member spacing: not more than 1/8 inch plus or minus from spacing indicated. Cumulative error shall not exceed the minimum fastening requirements of the sheathing or other finishing materials.
 - 3. Squareness: fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

3.5 FIELD REPAIRS AND PROTECTION

- A. Galvanized repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing, connections, and components with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions in a manner acceptable to the manufacturer and installer, which ensure cold-framed metal framing is without damage or deterioration at time of Substantial Completion.

3.6 FIELD QUALITY CONTROL

- A. Inspection and testing shall be in accordance with Special Inspections designated for this project as approved by the Building Official. Special Inspections must be documented with all corrective measures completed to satisfy compliance certificates as deemed necessary by the Jurisdiction.

END OF SECTION

SECTION 055000 - METAL FABRICATIONS

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. This Section includes the following:
 - 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 2. Loose steel lintels.
 - 3. Loose bearing and leveling plates.
 - 4. Steel pipe bollards
 - 5. High Security Key Vault (Knox box)
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Loose steel lintels.
 - 2. Anchor bolts and inserts to be cast into concrete or built into unit masonry.
- C. Related Sections include the following:
 - 1. Division 3 Section “Cast-in-Place Concrete” for installing anchor bolts, and other items to be cast into concrete.
 - 2. Division 4 Section “Unit Masonry Assemblies” for installing loose lintels, anchor bolts, and other items to be built into unit masonry.
 - 3. Division 6 Section “Rough Carpentry” for stock steel bolts and other rough hardware.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details for metal fabrications.
 - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
 - 2. Provide templates for anchors and bolts specified for installation under other Sections.
- B. Welding Certificates: Copies of certificates for welding procedures and personnel.

1.4 QUALITY ASSURANCE

- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to dimensions established for fabrications.
 - 2. Provide allowance for trimming and fitting at site.

1.6 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Provide materials with smooth, flat surfaces. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes. All steel permanently installed in the Work shall be domestically produced.

2.2 FERROUS METALS

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Steel Plates, Angles, Channels, and Bars: ASTM A 36/A 36M
- C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated.
- D. Gray-Iron Castings: ASTM A 48, Class 35B, unless another class is indicated.

- E. Steel Wide Flange Shapes: ASTM A992.

2.3 FASTENERS

- A. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- B. Anchor Bolts: ASTM F 1554, Grade 36.
- C. Machine Screws: ASME B18.6.3/ASME B18.6.7M.
- D. Plain Washers: Round, carbon steel, ASME B18.22.1 (ASME B18.22M).
- E. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in 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. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Alloy Group 1 or 2 stainless steel bolts complying with ASTM F 593/ASTM F 738M and nuts complying with ASTM F 594/ASTM F 836M.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
- C. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Concrete Materials and Properties: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 4000 psi, unless otherwise indicated.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32-inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
- D. Weld corners and seams continuously to comply with the following.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

2.7 LOOSE STEEL LINTELS.

- A. Loose Steel Lintels: Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Size loose lintels to provide bearing length at each side of openings to 8 inches unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.
- D. Shelf Angles: Fabricate shelf angles of sizes indicated and for attachment to framing.
 - 1. Shelf Angles in Exterior Walls: Galvanize.
- E. Loose Bearing and Leveling Plates: Provide loose bearing and leveling plates for beams bearing on masonry or concrete construction. Drill plates to receive anchor bolts.

2.8 STEEL PIPE BOLLARDS

- A. Fabricate bollards from Schedule 40 steel pipe.

2.9 MANUFACTURED ITEMS

A. High Security Key Vault (Knox Box)

1. Product: Knox-Vault 3200 series recess mount by Knox Company.
2. Authorizations: Coordinate keying and other options with the local fire department.

2.10 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.11 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with standard listed below:

1. ASTM A 123/A 123M or ASTM A 153/A 153M as applicable.

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below for environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, and true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together. Weld connections that are not to be left as exposed joints but cannot be shop welded. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication.

- C. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 INSTALLING PIPE BOLLARDS

- A. Anchor bollards in place with concrete footings. Support and brace bollards in position until concrete has cured.
- B. Fill bollards solidly with concrete, mounding top surface to shed water.

3.4 SETTING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.6 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

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DIVISION

06

**WOOD, PLASTICS AND
COMPOSITES**

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SECTION 061000 - ROUGH CARPENTRY

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. This Section includes the following:
 - 1. Framing with dimension lumber.
 - 2. Wood blocking and nailers.
 - 3. Wood grounds.
 - 4. Wood sleepers.
 - 5. Plywood backing panels.

1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. SPIB: The Southern Pine Inspection Bureau.
 - 4. WCLIB: West Coast Lumber Inspection Bureau.
 - 5. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

3. Special Warranty: Manufacturer's standard form in which wood treatment manufacturer agrees to replace or repair preservative and fire retardant treated lumber that fails in materials or treatment within specified warranty period.
 - a. Warranty Period for Preservative and Fire-Retardent Treated Lumber and Plywood: 20 Years

1.5 QUALITY ASSURANCE

- A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":
 1. Lumber.
 2. Plywood.
- B. Ohio Building Code: Wood blocking shall be pressure treated in conformance with O.B.C. Section 2303.1.8 and 2303.2. Pressure treated wood shall only be used at locations as indicated in Section 2304.11 of Ohio Building Code.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings. Keep materials dry during delivery and storage.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship for the following":
 1. Dimension lumber framing.
 2. Laminated-veneer lumber.
- B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. Provide dressed lumber, S4S, unless otherwise indicated.
 3. Seasoned Lumber: 15 percent maximum moisture content at time of dressing.
 4. Plywood: Type-Exterior CC, Construction Grade, Group 1.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP A U1.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- B. Kiln-dry lumber after treatment to maximum moisture content of 19 percent maximum and plywood after treatment to 15 percent maximum. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
 - 5. Wood floor plates that are installed over concrete slabs-on-grade.
 - 6. Use Category UC2 for interior construction not in contact with ground. Use Category UC3b for exterior construction not in contact with ground. Use Category UC4a for items in contact with ground.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Comply with performance requirements in AWP A C20 (lumber) and AWP A C27 (plywood).
 - 1. Use Exterior type for all locations.
- B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Application: Treat all rough carpentry, unless otherwise indicated.

2.4 DIMENSION LUMBER FRAMING

- A. Maximum Moisture Content: 19 percent.
- B. All lumber for rough carpentry: No. 2 grade and any of the following species:
 - 1. Mixed southern pine; SPIB.
 - 2. Spruce-pine-fir; NLGA.
 - 3. Douglas fir-south; WWPA.

4. Hem-fir; WCLIB or WWPA.
5. Douglas fir-larch (north); NLGA.
6. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 1. Blocking.
 2. Nailers.
 3. Rooftop equipment bases and support curbs.
 4. Grounds.
- B. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- C. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- D. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 PLYWOOD BACKING PANELS

- A. Telephone, Electrical, and Technology Equipment Backing Panels: DOC PS 1, Exterior, AC fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1.
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.8 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Self-adhesive, rubberized-asphalt compound, bonded to a high-density, polyethylene film to produce an overall thickness of not less than 0.025 inch.
- B. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
1. VOC content: 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Do not splice structural members between supports, unless otherwise indicated.
- D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- E. Provide fire blocking in concealed cavities as indicated and as follows:

1. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
- F. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- G. Comply with AWWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 1. Use copper naphthenate.
- H. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 1. NES NER-272 for power-driven fasteners.
 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
- I. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.2 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
- C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

END OF SECTION 061000

SECTION 061600 - SHEATHING

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 Sheathing.
 - 2. Wall Sheathing. (Garage Only)
 - 3. Interior Wall Sheathing
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for plywood backing panels.
 - 2. Section 072500 Weather Barriers for water-resistive barrier applied to exterior walls.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
 - 3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
 - 4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 5.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated plywood.
 - 2. Fire-retardant-treated plywood.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.
- B. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- C. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- C. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 1. Use treatment that does not promote corrosion of metal fasteners.
 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201/D 3201M at 92 percent relative humidity. Use where exterior type is not indicated.
 4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency. Retain first option in "Application" Paragraph below and delete subparagraphs if all wood is required to be fire-retardant treated; otherwise, retain second option and applicable subparagraphs.

2.5 ROOF SHEATHING

- A. Plywood Sheathing: DOC PS 1, Exterior, AC Fire-Retardant treated.
 1. Span Rating: Not less than 32/16.
 2. Nominal Thickness: Not less than 5/8 inch (15.87 mm).

2.6 GARAGE ROOF & WALL SHEATHING

- A. Plywood Sheathing: DOC PS 1, Exterior.
 - 1. Span Rating: Not less than 32/16.
 - 2. Nominal Thickness: Not less than 5/8 inch (15.87 mm).

2.7 INTERIOR WALL SHEATHING

- A. Plywood Sheathing: DOC PS 1, Exterior.
 - 1. Span Rating: Not less than 24/0.
 - 2. Nominal Thickness: Not less than 3/8 inch (8.99 mm).

2.8 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. For roof, parapet and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 - 2. For roof sheathing, provide fasteners with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on NES NER-272.
- D. Screws for Fastening Sheathing to Wood Framing: ASME B 18.2.1.
- E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

2.9 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.
- D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall, parapet and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

END OF SECTION 061600

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SECTION 061753 – SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications, apply to this section.

1.2 DESCRIPTION

- A. Work included: All labor and materials required to furnish and install wood trusses, connectors, bridging, bracing, and accessories as shown on the Drawings and required by these specifications.
- B. Related work specified elsewhere: The general provisions of the Contract apply to the work of this Section, as though reproduced herein. Carefully examine all other Sections and all Drawings for related work.

1.3 QUALITY ASSURANCE

- A. Reference standards:
 - 1. By the National Forest Products Association (NFPA):
 - a. National Design and Specification for Stress-Grade Lumber and Its Fastenings.
 - b. National Design Specification for Wood Construction.
 - 2. By American Wood Protection Association (AWPA)
 - a. AWPA Book of Standards
 - 3. Reference Standards by the Truss Plate Institute:
 - a. Design Specifications for Light Metal Plate Connected Wood Trusses.
 - b. Quality Control Manual
 - c. Bracing Wood Trusses Manual.
 - d. Handling and Erecting Wood Trusses Manual.
- B. Manufacturer's qualifications: regularly engaged in the design and manufacture of wood trusses for a minimum of 5 years.
 - 1. Pre-engineered metal truss manufacturer must adhere to the Special Inspection requirements for fabricated items.
- C. Where indicated on the Contract Documents, Fire-Retardant-Treated Wood (FRTW) trusses shall be pressure treated with fire retardant chemicals in accordance with AWPA C20.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Indicate design and fabrication data.

2. Indicated metal connectors, gauge of plates, nominal lumber size, and location of trusses.
3. Indicate lumber specifications, pitch, span, spacing, species, size, stress grades, and dimensions of each member.
4. Design loads including:
 - a. Top chord live load (for roof trusses, this shall be the controlling case of Live, Rain, or Snow load).
 - b. Top chord dead load.
 - c. Bottom chord live load.
 - d. Bottom chord dead load.
 - e. Additional loads and locations.
 - f. Environmental load design criteria (wind speed, snow, seismic, and all applicable factors as required to calculate the truss loads).
 - g. Other lateral loads including drag strut forces.
5. Adjustments to wood member and metal connector plate design values for conditions of use.
6. Indicate design loads, allowable stress increases, and maximum axial compression and tension forces in the truss members.
7. Indicate any camber to be fabricated within the trusses.
8. Calculated span to deflection ratio and/or maximum vertical and horizontal deflection for live and for live plus dead and KCR (creep factor) as applicable.
 - a. Roof trusses shall be designed to meet the following deflection criteria when the total design loads are applied:
 - i. $L/180$ when not supporting a ceiling.
 - ii. $L/240$ when supporting a suspended ceiling.
 - iii. $L/360$ when supporting a finished ceiling directly applied to the bottom chord, with or without metal furring channels.
 - iv. $L/600$ when supporting operable walls and partitions. Coordinate design loads and stacking requirements with wall supplier.
9. Indicate the locations, sizes, and connections of all permanent bracing required to prevent the buckling of individual truss web and chord members.
10. Provide all truss to truss connections and provide manufacturer's standard published literature which indicates allowable capacities.
11. Provide truss field assembly requirements, if any.
12. Provide an erection plan which indicates the truss layout, identification marks, hanger designations, and location of each type of truss provided.
13. Indicate truss to truss connection hangers and provide manufacturer's standard published literature which indicates allowable capacities.
14. These drawings shall be sealed by a Professional Engineer registered in the state where the project is located.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Store fabricated trusses and sub-assemblies to ensure proper drainage and ventilation. Protect from damage, exposure to weather, or standing water.
- B. Schedule delivery of trusses to minimize job site storage. If storage is required on the site, place trusses on blocking off the ground and in upright position. Cover with waterproof membrane.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Lumber:
1. Lumber used shall be identified by grade mark of lumber inspection bureau or agency approved by the American lumber standards committee, and shall be the size, species, and grade as shown on the Truss Design Drawings, or equivalent as approved by the Truss Designer.
 2. Lumber shall be kiln dried and moisture content of lumber shall not be more than 15% or less than 7% at the time of fabrication.
 3. Adjustment of value for duration of load or conditions of use shall be in accordance with ANSI/TPI 1.
 4. Fire Retardant Treated (FRT) Lumber, if applicable, shall meet the specifications of the fire-retardant chemical manufacturer, the truss design, and ANSI/TPI 1 and shall be re-dried after treatment to 19% maximum moisture content at temperatures not to exceed 160°F (71°C) in accordance with AWPA Standards C20. FRT lumber design values shall be developed from approved test methods and procedures that consider potential strength-reduction characteristics, including the effects of elevated temperature and moisture. Design values shall be approved by the Authorities Having Jurisdiction. Lumber treater shall supply certificate of compliance.
- B. Metal Connector Plates:
1. Connector plates shall be deformed plate type, 20 gauge minimum steel, ASTM A446, Grade A, and galvanized ASTM A663, Coating G60.
 2. Hangers and connectors in contact with pressure-treated lumber are to be Batch/Post Hot Dipped Galvanized per ASTM A123 with a minimum G185 coating or Stainless Steel with chemical composition conforming to AISI 303/304 or AISI 316.
 3. In highly corrosive environments, special applied coatings or stainless steel may be required, as specified in the Construction Documents.
- C. Pressure Treated Lumber Fasteners:
1. Fasteners which includes nails, anchor rods, bolts, wedge anchors, sleeve anchors, etc. that are in contact with pressure treated lumber are to be Hot Dipped Galvanized per ASTM A153 with a minimum G185 coating or stainless steel with chemical composition conforming to AISI 303/304 or AISI 316.

2.2 DESIGN CRITERIA

- A. Design loading: refer to Contract Documents.
- B. During entire construction period, distribute concentrated loads adequately so that carrying capacity of any one truss or other component is not exceeded.
- C. Design the sizes and connections of all permanent bracing required to prevent buckling of truss members is the responsibility of the Truss Supplier and is to be included within the shop drawing submittal.

2.3 FABRICATION

- A. Cut truss members accurately to length, angle, and true to line to ensure tight joints for finished truss.
- B. Fabricate truss members in special jigs with members tightly clamped in place until connector plates have been installed.
- C. All joints shall be designed as set forth in the TPI standards. Open joints which depend on the stiffness of the metal connector plate to transmit stresses and improperly fitted joints are not permitted.
- D. Lumber defects, such as wane and knots, occurring in the connector plate area must not affect more than 10% of required plate area or number of effective teeth required for each truss member. Apply connector plates to both faces of truss at each joint, making firm, even contact. Cut wood members accurately. Fabricate with wood members in good contact with all trusses uniform. Field connections of truss subassemblies, where necessary, shall be in accordance with details shown on reviewed truss-engineering drawings.
- E. Build camber into the trusses, as required for dead load deflections, by properly positioning the members in the fabricating jig.
- F. Where field connections of the truss subassemblies are necessary, special nail-on splice plates are acceptable, providing the plate sizes and positions are shown on the truss-engineering design as approved by a Professional Engineer.
- G. Multi-ply trusses or girders shall be properly attached together (by nailing, screwing, or bolting) to ensure the trusses are able to perform according to their design as stipulated by the Truss Designer. Follow all requirements provided on the Truss Design Drawings. Whenever possible, connect multi-ply trusses together prior to erection/installation.
- H. Provide framing anchors as shown on the engineering design drawings.
- I. Stamp each truss with the name and address of the Truss Fabricator.

PART 3 - EXECUTION

3.1 HANDLING, INSTALLATION, AND BRACING

- A. Trusses shall be handled during manufacturing, delivery, and by the Contractor at the job site so as not to be subjected to excessive bending.
- B. Trusses shall be unloaded in a manner so as to minimize lateral strain. Trusses shall be protected from damage that might result from on-site activities and environmental conditions. Trusses shall be handled in such a way as to prevent toppling when banding is removed.
- C. Contractor shall be responsible for the handling, installation, and temporary restraint/bracing of the trusses in a good workmanlike manner and in accordance with the

recommendation set forth in SBCA/TPI's Building Component Safety Information (BCSI): Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses.

- D. Apparent damage to trusses, if any, shall be reported to the Truss Manufacturer prior to erection. Repair as required.
- E. Trusses shall be set and secured level and plumb, and in correct location. Each truss shall be held in correct alignment until specific permanent restraint and bracing is installed.
- F. Cutting and altering of trusses is not permitted. If any truss should become broken, damaged, or altered, written concurrence and approval by a Registered Design Professional is required.
- G. Concentrated loads shall not be placed on top of trusses until all specified restraint and bracing has been installed and structural sheathing is permanently nailed in place. Specifically avoid stacking full bundles of construction materials or other concentrated loads on top of trusses.
- H. The truss submittal package and any supplementary information provided by the Truss Manufacturer shall be provided by the Contractor to the individual or organization responsible for the installation of the trusses.
- I. Trusses shall be permanently restrained and braced in a manner consistent with good Building practices as outlined in BCSI and in accordance with the requirements of the Construction Documents. Trusses shall furthermore be anchored or restrained to prevent out-of-plane movement to keep all truss members from simultaneously buckling together in the same direction. Such permanent lateral restraint shall be accomplished by: (a) anchorage to solid end walls; (b) permanent diagonal bracing in the plane of the web members; or (c) other suitable means.
- J. Install permanent braces on members as required and noted in the shop drawings to prevent buckling of the members.
- K. Provide continuous "strong back" through all floor trusses equivalent to a 2x8 at center of trusses spanning greater than 15 feet. Attach to each truss with a minimum of five 10d nails. Lap 2x8's across two trusses minimum.

3.2 FIELD QUALITY CONTROL

- A. Inspection and testing shall be in accordance with Special Inspections designated for this project as approved by the Building Official. Special Inspections must be documented with all corrective measures completed to satisfy compliance certificates as deemed necessary by the Jurisdiction.

END OF SECTION

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SECTION 062023 - INTERIOR FINISH CARPENTRY

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. This Section includes the following:
 - 1. Interior standing and running trim.
 - 2. Shop Finishing of woodwork.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
 - 2. Division 09 Section "Painting and Finishing" for final finishing of Finish Carpentry.

1.3 DEFINITIONS

- A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NHLA: National Hardwood Lumber Association.
 - 3. NLGA: National Lumber Grades Authority.
 - 4. SPIB: The Southern Pine Inspection Bureau.
 - 5. WCLIB: West Coast Lumber Inspection Bureau.
 - 6. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical treatment manufacturer's written instructions for finishing treated material.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
4. For cabinet hardware and accessories and finishing materials and process.

B. Samples:

1. For each species and cut of lumber and panel products with non-factory-applied finish, with 1/2 of exposed surface finished, 50 sq. in. for lumber and 8 by 10 inches for panels.
2. Plastic laminates and melamines for each type, color, pattern and surface finish.

C. Shop Drawings: Show location of each item. Dimensioned plans and elevations, large scale details, attachment devices, and other components.

1.5 QUALITY ASSURANCE

A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":

1. Interior standing and running trim.
2. Interior plywood paneling.
3. Engineered wood cabinets.

B. Quality Standards: Except as otherwise shown or specified, comply with specified provisions of the Architectural Woodwork Institute (AWI) "Quality Standards."

1. Custom grade.

C. Optimum Moisture Content: Kiln-dry woodwork to an average moisture content within the following ranges or as otherwise recommended by applicable Quality Standards for the regional climatic conditions involved.

1. Interior woodwork – 5 to 10 percent.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect materials against weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation within and around stacks and under temporary coverings.

B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and

HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC's Board of Review.
 - 1. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
 - 2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.
- B. Wood Products:
 - 1. Hardboard: AHA A 135.4.
 - 2. Medium-Density Fiberboard: ANSI A 208.2 Grade MD.
 - 3. Particleboard: ANSI A 208.1 Grade M-2.
 - 4. Softwood Plywood: DOC PS1, Medium Density overlay.
 - 5. Veneer-Faces Panel Products (Hardwood Plywood): HPVA HP-1.

2.2 STANDING AND RUNNING TRIM

- A. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
 - 1. Species and Grade: Natural Ash; Clear; NHLA.
 - 2. Maximum Moisture Content: 10 percent.
 - 3. Finger Jointing: Not allowed.
 - 4. Gluing for Width: Use for lumber trim wider than 6 inches.
 - 5. Veneered Material: Not allowed.
 - 6. Face Surface: Surfaced (smooth).
 - 7. Matching: Selected for compatible grain and color.
- B. Standing and running trim shall be, quartersawn, solid Natural Ash, conforming to AWI Section 300. All exposed edges to be eased unless noted otherwise.
 - 1. Backout or groove backs of flat trim members and kerf backs of other wide flat members, except for members with ends exposed in finished work.

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
 - 1. VOC Content: Not more than 30 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Paneling Adhesive: Comply with paneling manufacturer's written recommendations for adhesives.
 - 1. VOC Content: Not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.
 - 1. VOC Content: Not more than 70 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 FABRICATION

- A. General: Complete fabrication to maximum extent possible before shipment to project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
 - 1. Interior woodwork grade: Premium
 - 2. Shop cut opening to maximum extent possible. Sand edges of cutouts to remove splinters and burrs. Seal edges of openings in countertops with a coat of polyurethane.
- B. Interior Standing and Running Trim.
 - 1. For transparent-finished trim items wider than available lumber, use veneer construction, do not glue for width.
 - 2. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finish work.
 - 3. Assemble casing in plant except where limitations of access to place of installation required field assembly.

2.5 SHOP FINISHING

- A. Finish Architectural woodwork at fabrication shop. Defer only final touch-up, cleaning and polishing until after installation.
- B. Backpriming: Apply one coat of sealer or primer, compatible with finish coats to concealed surfaces of woodwork.
- C. Transparent finish:

1. Grade: Premium
2. AWI Finish System: Catalyzed vinyl
3. Staining: Match approved sample for color
4. Wash coat for stained finish: Apply a wash-coat sealer to woodwork made from closed grain wood before staining and finishing.
5. Sheen: Satin, 31-45 gloss units as measured on 60-degree gloss meter per ASTM D523.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 48 hours unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 1. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal all cut surfaces.
 2. Countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.
 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
 4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.
- C. Finish: Refer to Division 9 for final finishing of finish carpentry items.

3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
 - 1. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
 - 2. Install trim after gypsum board joint finishing operations are completed.
 - 3. Drill pilot holes in hardwood before fastening to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 PANELING INSTALLATION

- A. Plywood Paneling: Select and arrange panels on each wall to minimize noticeable variations in grain character and color between adjacent panels. Leave 1/4-inch gap to be covered with trim at top, bottom, and openings. Install with uniform tight joints between panels.
 - 1. Attach panels to supports with manufacturer's recommended panel adhesive and fasteners. Space fasteners as recommended by panel manufacturer.
 - 2. Conceal fasteners to greatest practical extent.

3.6 CABINETS INSTALLATION

- A. Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.
 - 1. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with N°.10 wafer-head screws sized for 1-inch penetration into wood framing, blocking or hanging strips; and/or N°.10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish, depending upon the wall conditions present.
- B. Countertops: Install accordingly to manufacturers recommendations.

3.7 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.8 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.9 PROTECTION

- A. Protect installed products from damage from weather and other causes during remainder of the construction period.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

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SECTION 066511 – SOLID SURFACE FABRICATIONS

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 the following horizontal and trim solid surface product types:

- 1. Windowsills

- B. Related Sections include the following:

- 1. Division 6 Section “Rough Carpentry” for Blocking.

1.3 DEFINITION

- A. Solid surface is defined as nonporous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

1.4 SUBMITTALS

- A. Product data:

- 1. For each type of product indicated.
- 2. Product data for the following:
 - a. Chemical-resistant tops

- B. Shop drawings:

- 1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
 - a. Show full-size details, edge details, thermoforming requirements, attachments, etc.
 - b. Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.

- C. Samples:

- 1. For each type of product indicated.
 - a. Submit minimum 6-inch by 6-inch sample in specified gloss.
 - b. Cut sample and seam together for representation of inconspicuous seam.
 - c. Indicate full range of color and pattern variation.
- 2. Approved samples will be retained as a standard for work.

- D. Product data:

- E. Indicate product description, fabrication information and compliance with specified performance requirements. Product certificates:

- 1. For each type of product, signed by product manufacturer.

F. Maintenance data:

1. Submit manufacturer's care and maintenance data, including repair and cleaning instructions.
 - a. Maintenance kit for finishes shall be submitted.
2. Include in project closeout documents.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.

B. Fabricator/installer qualifications:

1. Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.

C. Applicable standards:

1. Standards of the following, as referenced herein:
 - a. American National Standards Institute (ANSI)
 - b. American Society for Testing and Materials (ASTM)
 - c. National Electrical Manufacturers Association (NEMA)
 - d. NSF International
 - e. Fire test response characteristics: Provide with the following Class A (Class I) surface burning characteristics as determined by testing identical products per UL 723 (ASTM E84) or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1) Flame Spread Index: 25 or less.
 - 2) Smoke Developed Index: 450 or less.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver no components to project site until areas are ready for installation.
- B. Store components indoors prior to installation.
- C. Handle materials to prevent damage to finished surfaces.
 1. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.7 WARRANTY

- A. Provide manufacturer's warranty against defects in materials.
 1. Warranty shall provide material and labor to repair or replace defective materials.
 2. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.
- B. Manufacturer's warranty period:
 1. Ten years from date of substantial completion.

1.8 MAINTENANCE

- A. Provide maintenance requirements as specified by the manufacturer.

PART 2 — PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:

1. Subject to compliance with requirements, provide products by one of the following:
 - a. Corian® surfaces from the DuPont company (basis of design).
 - b. Insert manufacturer's name.

2.2 MATERIALS

A. Solid polymer components

1. Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6, having minimum physical and performance properties specified.
2. Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing

B. Thickness:
1. 1/2 inch

C. Edge treatment:
1.
2.
3.
4. As
indicated

I. Performance characteristics:

| Property | Typical Result | Test |
|--------------------|---|-----------------------------------|
| Tensile Strength | 6,000 psi | ASTM D 638 |
| Tensile Modulus | 1.5×10^{-6} psi | ASTM D 638 |
| Tensile Elongation | 0.4% min. | ASTM D 638 |
| Flexural Strength | 10,000 psi | ASTM D 790 |
| Flexural Modulus | 1.2×10^{-6} psi | ASTM D 790 |
| Hardness | >85 | Rockwell "M" Scale |
| | 56 | ASTM D 785 Barcol Impressor |
| Thermal Expansion | 3.02×10^{-5} in./in./°C (1.80×10^{-5} in./in./°F) | ASTM D 2583 ASTM D 696 |

| | | |
|--|--|---|
| Gloss (60°Gardner) Light Resistance | 5–75 (matte—highly polished) (Xenon Arc) No effect | ANSI Z124 NEMA LD 3-2000 Method 3.3 |
| Wear and Cleanability | Passes | ANSI Z124.3 & Z124.6 |
| Stain Resistance: Sheets | Passes | ANSI Z124.3 & Z124.6 |
| Fungus and Bacteria Resistance | Does not support microbial growth | ASTM G21&G22 |
| Boiling Water Resistance | No visible change | NEMA LD 3-2000 Method 3.5 |
| High Temperature Resistance | No change | NEMA LD 3-2000 Method 3.6 |
| Izod Impact (Notched Specimen) | 0.28 ft.-lbs./in. of notch | ASTM D 256 (Method A) |
| Ball Impact | No fracture—1/2 lb. ball: | NEMA LD 3-2000 |
| Resistance: Sheets | 1/4" slab—36" drop 1/2" slab—144" drop | Method 3.8 |
| Weatherability | $\Delta E^*_{94} < 5$ in 1,000 hrs. | ASTM G 155 |
| Specific Gravity † | 1.7 | |
| Water Absorption | Long-term 0.4% (3/4") 0.6% (1/2") 0.8% (1/4") | ASTM D 570 |
| Toxicity | 99 (solid colors) 66 (patterned colors) | Pittsburgh Protocol Test ("LC50" Test) |
| Flammability | All colors (Class I and Class A) | ASTM E 84, NFPA 255 & UL 723 |
| Flame Spread Index | <25 | |
| Smoke Developed Index | <25 | |

† Approximate weight per square foot: 1/4" (6 mm) 2.2 lbs., 1/2" (12.3 mm) 4.4 lbs.
 Shapes meet or exceed the ANSI Z124.3 and ANSI Z124.6 standards for plastic sinks and lavatories.
 NEMA results based on the NEMA LD 3-2000

2.3 ACCESSORIES

A. Joint adhesive:

1. Manufacturer’s standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.

B. Sealant:

1. Manufacturer’s standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.

2.4 FACTORY FABRICATION

A. Shop assembly

1. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.
2. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.
 - a. Reinforce with strip of solid polymer material, 2" wide.
3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.
4. Rout and finish component edges with clean, sharp returns.
 - a. Rout cutouts, radii and contours to template.
 - b. Smooth edges.
 - c. Repair or reject defective and inaccurate work.

2.5 FINISHES

A. As Selected by Architect from the manufacturer's standard color chart.

B. Finish:

1. Provide surfaces with a uniform finish.
 - a. Matte; gloss range of 5–20.

PART 3 — EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
 1. Provide product in the largest pieces available.
 2. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.
 - a. Exposed joints/seams shall not be allowed.
 3. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
 4. Cut and finish component edges with clean, sharp returns.
 5. Rout radii and contours to template.
 6. Anchor securely to base cabinets or other supports.
 7. Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.
 8. Carefully dress joints smooth, remove surface scratches and clean entire surface.

3.3 REPAIR

- A. Repair or replace damaged work which cannot be repaired to architect's satisfaction.

3.4 CLEANING AND PROTECTION

- A. Keep components clean during installation.
- B. Remove adhesives, sealants and other stains.

END OF SECTION 066511

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DIVISION

07

**THERMAL & MOISTURE
PROTECTION**

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SECTION 072100 - THERMAL INSULATION

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. This Section includes the following:

1. Foam-plastic board insulation (exterior walls & perimeter foundation walls).
2. Polyisocyanurate Board Insulation
3. Glass-fiber blanket insulation (regular batts and sound attenuation batts).

- B. Related Sections:

1. Division 04 Section "Unit Masonry" for insulation installed in cavity walls and masonry cells.
2. Division 07 Section "Spray-Applied Polyurethane Foam Insulation" (Closed Cell).
3. Division 07 Section "Spray-Applied Polyurethane Foam Insulation" (Open Cell).
4. Division 09 Section "Gypsum Board" for installation in metal-framed assemblies of insulation specified by referencing this Section.
5. Division 22 Section "Plumbing Insulation."
6. Division 23 Section "HVAC Insulation."

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Recycled Content: Provide glass and slag-wool-fiber/rock-wool-fiber insulation with recycled content so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 10 percent.

1.5 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 manufacturers 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 FOAM-PLASTIC BOARD INSULATION – FOUNDATION WALLS

- A. Manufacturers:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company.
 - c. Owens Corning.
 - d. Pactiv Building Products Division.
- B. Extruded-Polystyrene Board Insulation: ASTM C 578, Type VI, with a density of 1.60 lb/cu. ft. min., compressive strength 40 psi.
 - 1. Board thickness – 2-inch unless shown otherwise.

2.2 POLYISOCYANURATE CONTINUOUS BOARD INSULATION – EXTERIOR WALLS

- A. Polyisocyanurate Board Insulation with Facers Both Sides: Rigid cellular foam, complying with ASTM C1289; Type I, aluminum foil both faces; Class 2, glass fiber-reinforced core.
 - 1. Basis of Design: DuPont de Nemours Inc; **Thermax™ Sheathing**:
 - 2. Flame Spread Index (FSI): Class A - 0 to 25 for both core AND finished product, when Tested in accordance with ASTM E84.
 - 3. Smoke Developed Index (SDI): 450 or less for both core AND finished product, when tested in accordance with ASTM E84.

4. Front Facer: 1.0 mil smooth aluminum.
5. Back Facer: 1.0 mil smooth aluminum.
6. Board Size: 48 by 96 inch (1220 by 2440 mm).
7. Board Thickness: 1-inch (25.4 mm).
8. Board Edges: Square.
9. Sustainability: Third party listed Environmental Product Declaration certificate.

2.3 GLASS-FIBER BLANKET INSULATION – SOUND ATTENUATION

A. Manufacturers:

1. CertainTeed Corporation.
2. Johns Manville.
3. Knauf Fiber Glass.
4. 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.

1. Blanket thickness for walls: Fill entire depth of framing or void without compressing insulation blanket or provide insulation thickness as shown on the Drawings.
2. Provide in 24-inch widths, and 6-inch depth where shown for application on suspended acoustical ceilings.
3. Blanket thickness – fill entire depth of framing or void without compressing insulation blanket or provide insulation thickness as shown on the Drawings.

C. Glass-Fiber Blanket, Kraft Faced: ASTM C 665, Type II (non-reflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is vapor barrier); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Blanket thickness – fill entire depth of framing or void without compressing insulation blanket or provide insulation thickness as shown on the Drawings.

D. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:

1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

2.4 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

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 including removing projections capable of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturers 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. 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.
- E. 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.

3.4 INSTALLATION OF PERIMETER INSULATION

- A. On vertical foundation wall surfaces, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer. Extend insulation a minimum of 24 inches below finished exterior grade line. Seal joints between 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.

3.5 INSTALLATION OF INSULATION FOR SOUND ATTENUATION

- A. Where glass-fiber blankets are indicated for sound attenuation above ceilings, friction-fit sound attenuation batts in place, filling entire stud cavity. Sound attenuation blankets shall extend to full height of wall. Butt insulation together tightly to reduce sound transmission.
- B. Where glass-fiber blankets are indicated for sound attenuation in metal stud walls, install blanket insulation over entire ceiling area in thicknesses indicated. When insulation is being applied in continuous heights greater than 8-feet, supplementary support shall be provided to hold the insulation in place. Butt insulation together tightly to reduce sound transmission. Carefully fit insulation around penetrations such as junction boxes and outlets.

3.6 PROTECTION

- A. Protect installed insulation 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.

END OF SECTION 072100

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SECTION 072119 – SPRAY-APPLIED POLYURETHANE FOAM INSULATION (CLOSED CELL)

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. This Section includes the following:
 - 1. Spray-applied polyurethane foam insulating material in wall and roof construction.
- B. Related Sections include the following:
 - 1. Division 07 Section "Thermal Insulation."
 - 2. Division 07 Section "Spray-Applied Polyurethane Foam Insulation (Open Cell)."

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Provide data on materials, describing insulation properties and surface burning characteristics.
 - 2. Manufacturer's installation instructions indicating special procedures and perimeter conditions requiring special treatments.
- B. Product Certificates: For each type of product indicated, signed by an officer in the firm, stating that the proposed material is classed "asbestos free" and that there are no unacceptable levels of naturally occurring asbestos in any of the component materials and the proposed material contains no corrosive material along with all corrosiveness test reports.
- C. Qualification Data: For Applicator.

1.4 QUALITY ASSURANCE

- A. Recycled Content: Provide insulation with recycled content so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 10 percent.
- B. Applicator Qualifications: A firm or individual certified, licensed, or otherwise qualified by the manufacturer as experienced and with sufficient trained staff to apply manufacturer's products according to specified requirements. A manufacturer's willingness to sell its product to Contractor or to an applicator engaged by Contractor does not in itself confer qualification on the buyer.

- C. Material Guarantee: Manufacturer shall warrant material to conform to the specifications and be free of manufacturing defects adversely affecting the use and purpose of the material. Faulty material shall be replaced at the jobsite without cost.
- D. Regulatory Requirements
 - 1. Comply with ASTM E84/UL 723, tested at a minimum of 5-inch thickness, Class A.
 - a. Flame Spread: Less than 25.
 - b. Smoke Development: less than 450.
- E. Protect people and materials from over-spray and contact with chemicals and gases.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, shelf life if applicable, and fire-resistance ratings applicable to Project.
- B. Use materials with limited shelf life within period indicated. Remove from Project site and discard materials whose shelf life has expired.
- C. Store materials inside, under cover, and aboveground; keep dry until ready for use. Remove from Project site and discard wet or deteriorated materials.
- D. Avoid spillage. Immediately notify Owner if spillage occurs and start cleanup procedures. Clean spills and leave the area as it was prior to spill.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Apply insulation within range of ambient and substrate temperatures recommended by manufacturer. Do not apply to a damp or wet substrate unless specifically permitted by manufacturer
 - 1. Do not apply in wind, snow, rain, fog, or mist.
 - 2. Do not apply when the temperature of substrate surfaces and surrounding air temperature are below or above those recommended by the manufacturer.
 - 3. The product shall not be installed after the expiration date printed on the label of each container.
- B. Substrate: Proceed with spray application only after substrate construction, penetration work, and relating welding and other hot work has been completed. Verify that mortar has cured sufficiently and masonry substrate is dry to manufacturer's requirements.
- C. Ventilation: Ventilate building spaces during and after application. Use natural means or, if they are inadequate, forced-air circulation until material dries thoroughly.

1.7 COORDINATION

- A. Sequence and coordinate application of sprayed-on insulation with other related Work specified in other Sections to comply with the following requirements:
 - 1. Ensure that insulation is installed prior to installation of enclosing or concealing work, with sufficient time allowed for observation, testing, and correction of defective work.
- B. Coordinate installation with other Work in order to minimize the need for other trades to cut or remove insulation. As other trades successfully complete installation of their Work, maintain integrity of insulation coating by patching areas that have been removed or damaged prior to concealment by other Work.
- C. Ducts, piping, conduit, or other suspended equipment that interfere with the uniform application of the insulation material shall be positioned after the application of the sprayed-on insulation.
- D. Sequence and coordinate application of sprayed-on insulation with other related work specified in other Sections to comply with the following requirements:
 - 1. Provide temporary enclosure as required to confine spraying operations and protect the environment.
 - 2. Provide temporary enclosures for applications to prevent deterioration of fire-resistive material due to exposure to weather and to unfavorable ambient conditions for humidity, temperature, and ventilation.
 - 3. Avoid unnecessary exposure to abrasion and other damage likely to occur during construction operations subsequent to its application.
 - 4. Do not apply material to metal floor deck substrates until concrete topping has been completed.
 - 5. Do not begin applying material until clips, hangers, supports, sleeves, and other items penetrating insulation are in place.
 - 6. Lift all through-wall flashing up in order to spray beneath as required.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by Contractor and by Installer, in which manufacturer agrees to repair or replace sprayed-on insulation that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Cracking, flaking, spalling, or eroding in excess of specified requirements; peeling; or delaminating of sprayed-on insulation from substrates.
 - b. Not covered under the warranty are failures due to damage by occupants and Owner's maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, and other causes not reasonably foreseeable under conditions of normal use.
 - 2. Warranty Period: Two years from date of building occupancy.

PART 2 - PRODUCTS

2.1 SPRAY APPLIED POLYURETHANE FOAM INSULATION

A. Products: Subject to compliance with requirements, provide one of the following:

1. Manufacturers:

- a. Basis of Design: Dow Chemical Company FROTH-PAK 650
- b. Demilec LLC.; Heatlok Soy.
- c. Polymaster Insulating Foams; Incylthane 2000.
- d. NCFI Polyurethanes; InsulBloc.

B. Material Composition: Manufacturer's standard product, as follows:

1. Spray-Applied Polyurethane Foam Insulation: Sprayed-in-place two-component closed-cell polyurethane made by combining an isocyanate component with a polyol component.
2. ASTM C 1029, Type II, 1.5 lbs./cu. ft.
3. Core Density: ASTM D1622; 1.9-2.2 lb/cu. ft.
4. Water Vapor Transmission: ASTM E96 less than 1.0 perms at 2 inch thick.
5. R-Value/inch: ASTM C518; 6.4 min. at 1 inch thick hr/sq. ft./deg F/BTU.
6. Compressive Strength: ASTM D1621; 15 psi min.
7. Flame Spread: ASTM E84; less than 25.
8. Smoke Developed: ASTM E84; less than 450.
9. Tensile Bond Strength: ASTM C297; greater than 45 psi for masonry, greater than 15 psi for gypsum board.
10. Hydrostatic Pressure Resistance: AATCC 127; no failure at 55 cm head pressure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of work. Verify that surfaces and conditions are suitable prior to commencing work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected. A substrate is in satisfactory condition if it complies with the following:

1. Substrates comply with requirements in the Section where the substrate and related materials and construction are specified.
2. Concrete has cured the length of time recommended by the manufacturer. It is smooth and dry and without large voids, spalled areas, or sharp protrusions.
3. Masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.
4. Substrates are visibly dry and free of moisture. Test for capillary moisture by plastic sheet method ASTM D4263.

5. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, incompatible paints, incompatible encapsulants, or other foreign substances capable of impairing bond of material with substrates.
 6. Objects penetrating material, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 7. The substrates are not obstructed by ducts, piping, equipment, and other suspended construction that will interfere with applying material.
- B. Conduct tests according to material manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written installation instructions for preparing substrates indicated to receive insulation.
- B. Ensure that all work by other trades that may penetrate through insulation is in place and complete.
- C. Cover other work subject to damage from fallout or overspray of materials during application.
- D. Clean substrates of substances that could impair bond of material, including dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, and incompatible primers, paints, and encapsulants.
- E. Prime substrates where recommended in writing by manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive insulation.

3.3 LOCATIONS

- A. Apply insulation in the following locations:
 1. Exterior walls, seal walls to roofs with a continuous air barrier.
 2. Underside of roof deck. (See Drawing Details)

3.4 APPLICATION

- A. Comply with material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and spray on material, as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- B. Apply insulation that is identical to products tested as specified in Part 1 "Quality Assurance" Article and substantiated by test reports.
- C. Apply insulation to a reasonably uniform monolithic density without voids.
- D. Tolerances: Maximum variation from indicated thickness: Minus (-) 1/4-inch; Plus (+) 1/2-inch.

- E. Apply in consecutive passes as recommended by manufacturer to thickness as indicated on Drawings. Passes shall not be less than ½ inch and not greater than 2 inches.
- F. Do not install insulation within 3 inches of heat emitting devices such as light fixtures and chimneys.
- G. Finished surface of insulation shall be free of voids and embedded foreign objects.
- H. Remove masking materials and overspray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other Sections.
- I. Trim as required any excess thickness that would interfere with the application of cladding/covering system by other trades.
- J. Clean and restore surfaces soiled or damaged by work of this Section. Damage to work of this Section caused by other Sections shall be repaired by this Section at the expense of the subcontractor causing the damage.
- K. Make provisions for ventilation to properly dry the insulation after application. In enclosed areas lacking natural ventilation, air circulation and ventilation is to be provided.
- L. Patching and repairing of sprayed insulation damaged by other trades shall be performed under this Section and paid for by the trade(s) causing the damage.
- M. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- N. Protect insulation, according to advice of product manufacturer and Installer, from damage resulting from construction operations or other causes so insulation will be without damage or deterioration at time of Building Occupation.
- O. Coordinate application with other construction to minimize need to cut or remove insulation. As installation of other construction proceeds, inspect and patch any damaged or removed areas. Repair or replace work that has not successfully insulated the substrate.

END OF SECTION 078100

SECTION 072139 – SPRAY-APPLIED POLYURETHANE FOAM INSULATION (OPEN CELL)

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. This Section includes the following:
 - 1. Spray-applied polyurethane foam insulating material at Perimeter of doors and windows.
- B. Related Sections include the following:
 - 1. Division 07 Section "Thermal Insulation" for other insulation types.
 - 2. Division 07 Section "Spray-Applied Polyurethane Foam Insulation. (Closed Cell)"
 - 3. Division 07 Section "Weather Barriers"

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Provide data on materials, describing insulation properties and surface burning characteristics.
 - 2. Manufacturer's installation instructions indicating special procedures and perimeter conditions requiring special treatments.
- B. Product Certificates: For each type of product indicated, signed by an officer in the firm, stating that the proposed material is classed "asbestos free" and that there are no unacceptable levels of naturally occurring asbestos in any of the component materials and the proposed material contains no corrosive material along with all corrosiveness test reports.
- C. Qualification Data: For Installer.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual certified, licensed, or otherwise qualified by the manufacturer as experienced and with sufficient trained staff to apply manufacturer's products according to specified requirements. A manufacturer's willingness to sell its product to Contractor or to an applicator engaged by Contractor does not in itself confer qualification on the buyer.

- B. Material Guarantee: Manufacturer shall warrant material to conform to the specifications and be free of manufacturing defects adversely affecting the use and purpose of the material. Faulty material shall be replaced at the jobsite without cost.
- C. Regulatory Requirements
 - 1. Comply with ASTM E84/UL 723, tested at a minimum of 5-inch thickness, Class A.
 - a. Flame Spread: Less than 25.
 - b. Smoke Development: less than 450.
- D. Protect people and materials from over-spray and contact with chemicals and gases.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, shelf life if applicable, and fire-resistance ratings applicable to Project.
- B. Use materials with limited shelf life within period indicated. Remove from Project site and discard materials whose shelf life has expired.
- C. Store materials inside, under cover, and aboveground; keep dry until ready for use. Remove from Project site and discard wet or deteriorated materials.
- D. Avoid spillage. Immediately notify Owner if spillage occurs and start cleanup procedures. Clean spills and leave area, as it was prior to spill.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Apply insulation within range of ambient and substrate temperatures recommended by manufacturer. Do not apply to a damp or wet substrate unless specifically permitted by manufacturer
 - 1. Do not apply in snow, rain, fog, or mist.
 - 2. Do not apply when the temperature of substrate surfaces and surrounding air temperature are below or above those recommended by the manufacturer.
 - 3. The product shall not be installed after the expiration date printed on the label of each container.
- B. Substrate: Proceed with spray application only after substrate construction, penetration work, and relating welding and other hot work has been completed. Verify that mortar has cured sufficiently and masonry substrate is dry to manufacturer's requirements.
- C. Ventilation: Ventilate building spaces during and after application. Use natural means or, if they are inadequate, forced-air circulation until material dries thoroughly.

1.7 COORDINATION

- A. Sequence and coordinate application of sprayed-on insulation with other related Work specified in other Sections to comply with the following requirements:
 - 1. Ensure that insulation is installed prior to installation of enclosing or concealing work, with sufficient time allowed for observation, testing, and correction of defective work.
- B. Coordinate installation with other Work in order to minimize the need for other trades to cut or remove insulation. As other trades successfully complete installation of their Work, maintain integrity of insulation coating by patching areas that have been removed or damaged prior to concealment by other Work.
- C. Sequence and coordinate application of sprayed-on insulation with other related work specified in other Sections to comply with the following requirements:
 - 1. Provide temporary enclosure as required to confine spraying operations and protect the environment.
 - 2. Provide temporary enclosures for applications to prevent deterioration material due to exposure to weather and to unfavorable ambient conditions for humidity, temperature, and ventilation.
 - 3. Avoid unnecessary exposure to abrasion and other damage likely to occur during construction operations subsequent to its application.
 - 4. Do not begin applying material until clips, hangers, supports, sleeves, and other items penetrating insulation are in place.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by Contractor and by Installer, in which manufacturer agrees to repair or replace sprayed-on insulation that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Cracking, flaking, spalling, or eroding in excess of specified requirements; peeling; or delaminating of sprayed-on insulation from substrates.
 - b. Not covered under the warranty are failures due to damage by occupants and Owner's maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, and other causes not reasonably foreseeable under conditions of normal use.
 - 2. Warranty Period: Two years from date of building occupancy.

PART 2 - PRODUCTS

2.1 SPRAY APPLIED POLYURETHANE FOAM INSULATION

- A. Products: Subject to compliance with requirements, provide one of the following:

1. Manufacturers:
 - a. BASF; Enertite.
 - b. BaySystems LLC.; Bayseal OC.
 - c. Demilec LLC.; Sealection 500.
 - d. NCFI Polyurethanes; Sealite Pro Open Cell

B. Material Composition: Manufacturer's standard product, as follows:

1. Spray-Applied Polyurethane Foam Insulation: Sprayed-in-place semi-rigid open-cell polyurethane made by combining an isocyanate component with a polyol component.
2. Density: ASTM D 1622; 0.45 – 0.5 lb/cu. ft.
3. Water Vapor Transmission: ASTM E96; 6.6 perms at 3.5 inch thick.
4. R-Value/inch: ASTM C 518 - 90 days at 76 degree F, per inch - 3.81 sq. ft. h. degree F/BTU.
5. Compressive Strength: ASTM D1621; 0.7 psi min.
6. Surface Burning Characteristics: ASTM E84; Class I; Flame Spread Index 21; Smoke Developed Index 216.
7. Tensile Strength: ASTM D 1623; 5.6 lb. ft./sq. in.
8. Noise Reduction Coefficient (NRC) (ASTM C 423): 75.
9. Sound Transmission Class (STC) (ASTM E 413-87 1999): 49-51. Based on Specific wall design.
10. Off Gassing Tests (VOC Emissions) CGSB 51.23-92: Pass (No toxic vapors).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of work. Verify that surfaces and conditions are suitable prior to commencing work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected. A substrate is in satisfactory condition if it complies with the following:
 1. Substrates comply with requirements in the Section where the substrate and related materials and construction are specified.
 2. Concrete has cured the length of time recommended by the manufacturer. It is smooth and dry and without large voids, spalled areas, or sharp protrusions.
 3. Masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.
 4. Substrates are visibly dry and free of moisture. Test for capillary moisture by plastic sheet method ASTM D4263.
 5. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, incompatible paints, incompatible encapsulants, or other foreign substances capable of impairing bond of material with substrates.
 6. Objects penetrating material, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.

- B. Conduct tests according to material manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written installation instructions for preparing substrates indicated to receive insulation.
- B. Ensure that all work by other trades that may penetrate through insulation is in place and complete.
- C. Cover other work subject to damage from fallout or overspray of materials during application.
- D. Clean substrates of substances that could impair bond of material, including dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, and incompatible primers, paints, and encapsulants.
- E. Prime substrates where recommended in writing by manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive insulation.

3.3 LOCATIONS

- A. Apply insulation in the following locations:
 - 1. Exterior window, door, storefront, frames; at heads, jambs, and sills, to fill all voids in framing and between frames and wall openings.

3.4 APPLICATION

- A. Comply with material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and spray on material, as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- B. Apply insulation that is identical to products tested as specified in Part 1 "Quality Assurance" Article and substantiated by test reports.
- C. Apply insulation to a reasonably uniform monolithic density without voids.
- D. Finished surface of insulation shall be free of voids and embedded foreign objects.
- E. Remove masking materials and overspray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other Sections.
- F. Trim as required any excess thickness that would interfere with the application of cladding/covering system by other trades.

- G. Clean and restore surfaces soiled or damaged by work of this Section. Repair damage to work of this Section caused by other Sections, at the expense of the subcontractor causing the damage.
- H. Make provisions for ventilation to properly dry the insulation after application. Provide air circulation and ventilation in enclosed areas lacking natural ventilation.
- I. Patching and repairing of sprayed insulation damaged by other trades shall be performed under this Section and paid for by the trade(s) causing the damage.

3.5 CLEANING, PROTECTING, AND REPAIR

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Protect insulation, according to advice of product manufacturer and Installer, from damage resulting from construction operations or other causes so insulation will be without damage or deterioration at time of Building Occupation.
- C. Coordinate application with other construction to minimize need to cut or remove insulation. As installation of other construction proceeds, inspect and patch any damaged or removed areas. Repair or replace work that has not successfully insulated the substrate.

END OF SECTION 072139

SECTION 072500 – WEATHER BARRIERS

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 SECTION INCLUDES

- A. Weather barrier membrane
- B. Seam Tape
- C. Flashing
- D. Fasteners

1.3 REFERENCES

- A. ASTM International
 - 1. ASTM C 920; Standard Specification for Elastomeric Joint Sealants
 - 2. ASTM C 1193; Standard Guide for Use of Joint Sealants
 - 3. ASTM D 882; Test Method for Tensile Properties of Thin Plastic Sheeting
 - 4. ASTM D 1117; Standard Guide for Evaluating Non-woven Fabrics
 - 5. ASTM E 84; Test Method for Surface Burning Characteristics of Building Materials
 - 6. ASTM E 96; Test Method for Water Vapor Transmission of Materials
 - 7. ASTM E 1677; Specification for Air Retarder Material or System for Framed Building Walls
 - 8. ASTM E 2178; Test Method for Air Permeance of Building Materials
- B. AATCC – American Association of Textile Chemists & Colorists
 - 1. Test Method 127 Water Resistance: Hydrostatic Pressure Test
- C. TAPPI
 - 1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
 - 2. Test Method T-460; Air Resistance of Paper (Gurley Hill Method)

1.4 SUBMITTALS

- A. Refer to Section 013300 Submittal Procedures.
- B. Product Data: Submit manufacturer current technical literature for each component.
- C. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inches.
- D. Quality Assurance Submittals
 - 1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
 - 2. Manufacturer Instructions: Provide manufacturer's written installation instructions.
- E. Closeout Submittals
 - 1. Refer to Section 017700 Closeout Procedures.

1.5 QUALITY ASSURANCE

- A. Qualifications
 - 1. Installer shall have experience with installation of DuPont™ Tyvek® weather barrier assemblies under similar conditions.
 - 2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
 - 3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.
- B. Mock-up
 - 1. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
 - a. Mock-up size: To be determined by Architect.
 - b. Mock-up Substrate: Match wall assembly construction, including window opening.
 - c. Mock-up may remain as part of the work.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 016000 Product Requirements.
- B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store weather barrier materials as recommended by weather barrier manufacturer.

1.7 SCHEDULING

- A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.
- B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

1.8 WARRANTY

- A. Special Warranty
 1. Weather barrier manufacturer's warranty for weather barrier for a period of five years from date of Substantial Completion.
 2. Approval by weather barrier manufacturer for warranty is required prior to assembly installation.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. DuPont™ Building Innovations™; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 1.800.44TYVEK (8-9835); <http://construction.tyvek.com>

2.2 MATERIALS

- A. Basis of Design: High-performance, flash spun-bonded olefin, non-woven, non-perforated, secondary weather barrier is based upon DuPont™ Tyvek® CommercialWrap® and related assembly components.
- B. Products of other manufacturers systems will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified system.
- C. Performance Characteristics:
 1. Air Penetration: 0.001 cfm/ft² at 75 Pa, when tested in accordance with ASTM E 2178. Type I per ASTM E 1677.
 2. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E 96, Method B.
 3. Water Penetration Resistance: Minimum 280 cm when tested in accordance with AATCC Test Method 127.
 4. Basis Weight: Minimum 2.7 oz/yd², when tested in accordance with TAPPI Test Method T-410.
 5. Air Resistance of Paper: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.
 6. Tensile Strength: Minimum 38/35 lbs/in., when tested in accordance with ASTM D 882, Method A.
 7. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D 1117.

8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84.
Flame Spread: 10, Smoke Developed: 10.

2.3 ACCESSORIES

- A. Seam Tape: DuPont™ Tyvek® Tape as manufactured by DuPont™ Building Innovations™.
- B. Fasteners:
 1. Tyvek® Wrap Caps, as manufactured by DuPont™ Building Innovations™: #4 nails with large 1-inch plastic cap fasteners.
- C. Sealants
 1. Provide sealants that comply with ASTM C 920, elastomeric polymer sealant to maintain watertight conditions.
 2. Provide Sealants recommended by the weather barrier manufacturer.
- D. Adhesives:
 1. Provide adhesive recommended by weather barrier manufacturer.
- E. Primers:
 1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
- F. Flashing
 1. DuPont™ FlexWrap™, as manufactured by DuPont™ Building Innovations™: flexible membrane flashing materials for window openings and penetrations.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION - WEATHER BARRIER

- A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations
- B. Install weather barrier prior to installation of windows and doors.
- C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

- D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level
- E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
- F. Window and Door Openings: Extend weather barrier completely over openings.
- G. Overlap weather barrier
 - 1. Exterior corners: minimum 12 inches.
 - 2. Seams: minimum 6 inches.
- H. Weather Barrier Attachment:
 - 1. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 6 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

3.3 SEAMING

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

3.4 OPENING PREPARATION *(for use with non-flanged windows – all cladding types)*

- A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.5 FLASHING *(for use with non-flanged windows – all cladding types)*

- A. Cut DuPont™ FlexWrap™ a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.
- D. Apply 9-inch wide strips of DuPont™ StraightFlash™ at jambs. Align flashing with interior edge of jamb framing. Start StraightFlash™ at head of opening and lap sill flashing down to the sill.

- E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.
- F. Install DuPont™ FlexWrap™ at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.
- G. Coordinate flashing with window installation.
- H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.
- I. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.
- J. Tape top of window in accordance with manufacturer recommendations.
- K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.6 OPENING PREPARATION (for use with flanged windows)

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

3.7 FLASHING (for use with flanged windows)

- A. Cut DuPont™ FlexWrap™ a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.
- D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.
- E. Install window according to manufacturer's instructions.

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

3.8 PROTECTION

- A. Protect installed weather barrier from damage.

END OF SECTION 072500

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SECTION 072616 - UNDERSLAB VAPOR BARRIER

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. This Section includes the following:
 - 1. Underslab vapor barrier.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-In-Place Concrete" for concrete slabs on grade.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Provide data on materials, describing properties.
 - 2. Manufacturer's installation instructions indicating special procedures and perimeter conditions requiring special treatments.
- B. Samples for Verification: For the following products:
 - 1. Underslab vapor barrier: 12-inch square sample including taped seam.

1.4 QUALITY ASSURANCE

- A. Supply all products from one manufacturer from those listed or pre-approved equivalent product submitted to the Architect for approval.
 - 1. Surface preparation.
 - 2. Application of an underslab vapor barrier.
- B. Material Guarantee: Manufacturer shall warrant material to conform to the specifications and be free of manufacturing defects adversely affecting the use and purpose of the material. Faulty material shall be replaced at the jobsite without cost.

PART 2 - PRODUCTS

2.1 UNDERSLAB VAPOR BARRIER

- A. Manufacturers: Subject to compliance with requirements, provide materials from one of the following:
1. Fortifiber Building Systems Group.
 2. Insulation Solutions Inc.
 3. Raven Industries.
 4. Reef Industries, Inc.
 5. Stego Industries, LLC.
 6. W.R. Meadows, Inc.

2.2 MATERIALS

- A. Vapor Barrier
1. Qualities
 - a. 15-mil minimum thickness.
 - b. Water Vapor Permeance less than or equal to 0.02 perms tested by ASTM E 96.
 - c. Puncture Resistance greater than or equal to 3,000 grams tested by ASTM D 1709.
 - d. Tensile Strength greater than or equal to 65 lbf/in tested by ASTM E 154, Sec. 9.
 - e. Water Vapor Barrier meets or exceeds “Class A” tested by ASTM E 1745.
 - f. Chemical Resistance “Unaffected” tested by ASTM E 154.

2.3 ACCESSORIES

- A. General: Auxiliary materials recommended by underslab vapor barrier manufacturer for intended use, and compatible with vapor barrier.
1. Vapor Barrier Seam Tape Products
 - a. Manufacturer’s standard all-weather adhesive seam tape meeting all ASTM E 1745 “Class A” vapor retarder specifications.
 2. Vapor Proofing Mastic Products
 - a. Manufacturer’s standard vapor proofing mastic with water vapor permeance less than or equal to 0.30 perms as tested by ASTM E 96
 3. Vapor Barrier Pipe Boot/Patching Membrane Products
 - a. Manufacturer’s standard all-weather adhesive pipe boot/patching membrane that is an all-weather adhesive backed membrane meeting all ASTM E 1745 “Class A” vapor retarder specifications (Must be a factory installed adhesive).

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. Prepare surfaces in accordance with manufacturers instructions.

3.3 APPLICATION

- A. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643-98.
 - 1. Unroll vapor barrier with the longest dimension parallel with the direction of the pour.
 - 2. Lap vapor barrier over footings and seal to foundation walls.
 - 3. Overlap joints 6 inches and seal with manufacturer's tape.
 - 4. Seal all penetrations (including pipes) with manufacturer's pipe boot and/or mastic.
 - 5. No penetration of the vapor barrier is allowed.
 - 6. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with tape.

END OF SECTION 007160

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SECTION 074113 - STANDING-SEAM METAL ROOF PANELS AND SHOP FORMED METAL
FABRICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including general and supplementary conditions and Division 01 Specification Section apply to this section.

1.2 SUMMARY

- A. Section includes standing-seam metal roof panels and shop formed fascia cover, gutters and down spouts.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site with Architect.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- C. Samples: For each type of metal panel indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: Two years from date of Substantial Completion.

- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

- 1. Finish Warranty Period: 20 years from date of Substantial Completion.

- C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.

- 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 1680 at the following test-pressure difference:

- 1. Test-Pressure Difference: 1.57 lbf/sq. ft..

- B. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:

- 1. Test-Pressure Difference: 2.86 lbf/sq. ft..

- C. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.

- D. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.

- 1. Uplift Rating: UL 60.

- E. FM Global Listing: Provide metal roof panels and component materials that comply with requirements in FM Global 4471 as part of a panel roofing system and that are listed in FM

Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.

1. Fire/Windstorm Classification: Class 1A-60.
2. Hail Resistance: MH.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations 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.

2.2 STANDING-SEAM METAL ROOF PANELS

A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

B. Vertical-Rib, Snap-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and striations between ribs, designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.

1. Manufacturers: Basis of design: Snap on Seam SS15 manufactured by Dimensional Metals Inc. or one of the following approved manufacturers.

- a. Pac-Clad
- b. Berridge

2. Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

- a. Nominal Thickness: 24 gauge minimum.
- b. Exterior Finish: Two-coat fluoropolymer.
- c. Color: As selected by Architect from manufacturers full range.

3. Clips: One-piece fixed to accommodate thermal movement.

- a. Material: 0.028-inch-nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.

4. Adjacent Flashings: To be of same material and finish as the roof panels.
5. Seam on center: 16 inches.
6. Seam Height: 1.5 inches.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
 - 1. Basis of Design Product: Subject to compliance with requirements, provide Grace Ice and Water Shield HT or a comparable high temperature product(s) by one of the following:
 - a. Dynaclad (DMI)
 - b. Deck Armor (GAF)
 - c. Roof Guard (IKO)
 - 2. Thermal Stability: Stable after testing at 240 deg F; ASTM D 1970.
 - 3. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.

2.4 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- C. Panel Sealants: Provide factory-applied seam sealant of non-curing butyl designed for metal-to-metal connections in concealed joints for watertight installation.

2.5 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal panel joints with factory-installed sealant that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.6 FINISHES

A. Panels and Accessories:

- 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat and apply coating to exposed metal surfaces to comply with coatings and resin manufacturers written instructions.

2.7 SHOP-FORMED SHEET METAL FABRICATIONS

- A. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fascia, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- B. Gutters: Fabricate to profile indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in uniform sections of maximum possible length with matching corner units, ends, outlet tubes, and other accessories. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion joint covers, and gutter accessories from same metal as gutters. Elevate back edge at least 1 inch above front edge. Fabricate from the following materials:
 - 1. Same material as roof panels.
 - 2. Gutter Profile: 7" Box Gutter Style D according to SMACNS's "Architectural Sheet Metal Manual"
 - 3. Corners: Mitered and continuously welded.
 - 4. Gutter Supports:
 - a. Gutter Brackets: Same material and finish as gutters. Spaced every 24-inches according to SMACNS's "Architectural Sheet Metal Manual".
 - b. Gutter Spacers: Same material and finish as gutters. Every 36-inches alternating with gutter brackets according to SMACNS's "Architectural Sheet Metal Manual".
 - 5. Gutter Accessories: Stainless steel wire ball downspout strainers.
- C. Downspouts: Plain rectangular (3.75 inches x 4.75 inches) complete with mitered elbows, fabricated from same material as metal roof panels. Furnish with metal hangers, from same material as downspouts, and anchors according to SMACNA's "Architectural Sheet Metal Manual" and as shown and dimensioned on the Drawings.
- D. Snow Retention System: Product: S-5 ColorGard as supplied by Dimensional Metals Inc. Non-penetrating mechanically clamped continuous snow retaining system. Complete system including S-5 clamps, Versaclips, Snowclips, bar and color insert shall match metal roof.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install sub framing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

1. Apply over the entire roof surface.

3.3 METAL PANEL INSTALLATION

- A. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.

1. Install clips to supports with self-tapping fasteners.
2. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.

- B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

- C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

3.4 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 074113.16

SECTION 074213 – FORMED METAL WALL PANELS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections apply to this Section.

1.2 SUMMARY

- A. Section includes complete system of concealed-fastener, lap-seam metal panels in the following applications:
 - 1. Metal wall panels.
- B. Related Requirements:
 - 1. Section 054000: Cold-Formed Metal Framing.
 - 2. Section 055000: Metal Fabrications.
 - 3. Section 072100: Thermal Insulation.
 - 4. Section 074800: Rainscreen Attachment System
 - 5. Section 079200: Joint Sealants.

1.3 REFERENCES

- A. Reference Standards:
 - 1. ASCE 7: Minimum Design Loads for Buildings and Other Structures.
 - 2. ASTM A653: Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
 - 3. ASTM A792: Steel Sheet, 55 % Aluminum Zinc Alloy Coated by the Hot Dip Process.
 - 4. ASTM C1371: Determination of Emittance of Materials Near Room Temperature Using Portable Emitters.
 - 5. ASTM C1549: Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
 - 6. ASTM D523: Specular Gloss.

 - 1. ASTM E283: Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - 2. ASTM E331: Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 - 3. ASTM E1592: Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
 - 4. ASTM E1918: Measuring Solar Reflectance of Horizontal and Low Sloped Surfaces in the Field.
 - 5. ASTM E1980: Calculating Solar Reflectance Index of Horizontal and Low Sloped Opaque Surfaces.
 - 6. CRRC-1 Method #1: Measuring Solar Reflectance of a Flat, Opaque, and Heterogeneous Surface Using a Portable Solar Reflectometer.
 - 7. SMACNA Architectural Sheet Metal Manual.

1.4 SUBMITTALS

- A. Product Data.
- B. Shop Drawings:
 - 1. Indicate thickness and dimensions of parts, fastenings and anchoring methods, details and locations of joints, transitions and other provisions necessary for thermal expansion and contraction.
 - 2. Indicate locations of field- and factory-applied sealant.
- C. Samples:
 - 1. Submit two samples, 12 inches long by full panel width, showing proposed metal thickness and seam profile.
 - 2. Submit standard color samples of metal for Architect's selection.
- D. Manufacturer Qualifications.
- E. Installer Qualifications: Submit list of completed projects, with names and contact information for architects and contractors.
- F. Test Reports: Indicating compliance of products with project requirements.
- G. Warranty Documentation.
- H. Insurance Documentation.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Ten years' experience, minimum, in factory fabrication of metal panels.
 - 2. Manufacturer shall carry \$2,000,000 liability insurance, minimum, for metal panel system.
- B. Installer Qualifications:
 - 1. Three years' experience, minimum, in application of metal roof or wall panels.
 - 2. Five satisfactory projects with metal panel work of similar scope and complexity to Work of this Project.
- C. Product Testing Agency Qualifications: Agency compliant with ISO/IEC Standard 17025, or an accredited independent agency recognized by the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement or ANSI.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Handling Requirements:
 - 1. Keep panels and accessory items dry.
 - 2. Protect against damage and discoloration.
 - 3. Handle panels with non-marring slings.
 - 4. Support panels to prevent permanent deformation.
 - 5. Store panels above ground, with one end elevated for drainage.
 - 6. Protect panels against standing water and condensation between adjacent surfaces.
 - 7. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and keep sheets separate for air-drying.

8. Painted panels shall be shipped with protective plastic sheeting or a strippable film coating between panels. Remove strippable film coating prior to installation. Do not allow strippable film coating to remain on panels in extreme heat, cold, or direct sunlight or other UV source.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard 25-year performance warranty, stating the following:
 1. Architectural fluorocarbon finish:
 - a. Will be free of fading or color change in excess of 5 Hunter delta-E units as determined by ASTM D2244-02.
 - b. Will not chalk in excess of numerical rating of 8 when measured in accordance with standard procedures specified in ASTM D4214-98 method D659.
 - c. Will not peel, crack, chip, or delaminate.
 2. Metal substrate will not rupture, fail structurally, or perforate.
- B. Installer's Warranty: Warranty panels, flashings, sealants, fasteners and accessories against defective materials and/or workmanship, covering repairs required to maintain wall panels watertight and weatherproof with normal usage for two years following Project Substantial Completion date.
 1. Furnish written warranty, signed by installer.

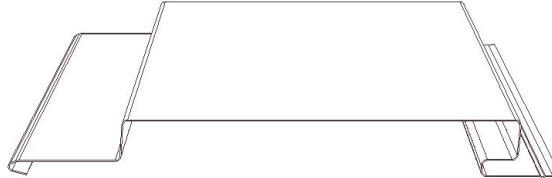
PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Manufacturers:
 1. AEP Span, a Division of ASC Profiles LLC.; Prestige Series[®]. (Basis of Design)
 2. Dimensional Metals Inc. (DMI)
- B. Substitution Limitations: Substitutions will be considered in accordance with Section 016000 "Product Requirements".
 1. Wind Uplift: As required by ASCE 7
 - a. Panel system shall be ASTM E1592 tested under the supervision of an ANSI or ISO/IEC accredited laboratory and the laboratory shall issue the test report. Test data based on ASTM E330 is not acceptable.
 - b. Deflection Limits: Withstand wind loads with deflections no greater than **1/180** of the span.
 2. Air Infiltration: 0.01 cfm/lf, maximum at a static difference of 6.24 psf when tested with sidelap sealant per ASTM E283.
 3. Water Penetration Under Static Pressure: No leakage at 20 psf when tested with sidelap sealant per ASTM E331.
 4. Thermal Movements: Accommodate thermal movement without buckling, joint opening, failure of connections, or other detrimental effects, through the following temperature changes:
 - a. 120 degrees F, ambient.
 - b. 180 degrees F, surface.

2.2 PANELS

- A. Panel: AEP Span, a Division of ASC Profiles LLC; Prestige Series®
1. Material: Steel conforming to ASTM A792.
 - a. 22 Gauge: Yield strength 50,000 psi; with aluminum-zinc alloy coating conforming to ASTM A792, Class AZ50.
 2. Profile and Pattern:
 - a. Prestige Series®, 10 Up / 2 Down Panel, flat (no ribs).



3. Finishes:
 - a. Exterior Panel Finish: Provide primer and finish coat on exposed faces; provide primer on concealed faces of panels.
 - 1) Dura Tech™ 5000: Polyvinylidene Fluoride, full 70 percent Kynar 500/Hylar 5000, consisting of a baked-on 0.15-0.20 mil corrosion resistant primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 8 to 15 when tested in accordance with ASTM D523 at 60 degrees.
 - 2) Exterior Panel Color: As selected from manufacturer's full range.
 - b. Interior Panel Finish: Corrosion-resistant primer; primer coat dry film thickness: 0.15 mils; polyester paint; dry film thickness of 0.35 mils, off-white to light gray in color.
- B. Sustainability Characteristics:
1. Recycled Content: 27 percent post-consumer recycled content
 2. Solar Performance:
 - a. Solar reflective index (SRI): Not less than **29** per ASTM E1980.
 - b. Thermal Emissivity: Not less than **0.75** per ASTM C1371.
 3. Shipping Distance: Provide panels manufactured at the following factory:
 - a. Fontana, California 92335

2.3 FRAMING AND SUBSTRATES

- A. Secondary Framing: See Section 054000 "Cold-Formed Metal Framing".
- B. Air Barrier: See Section 072724.13 "Air Barriers".

2.4 ACCESSORIES

- A. Clip: Panel clip sized to fit panels.
1. Product: AEP Span; Prestige Series® PS-12 Clip.
 2. Material: 16-gauge G90 galvanized, material in conformance with ASTM A-653 Class G90.

3. Low profile – works with all prestige panel profiles, and in both horizontal and vertical Applications. Features spring tab on one end to prevent male panel leg from backing out Of adjoining panel, hold down clamp on opposite end to keep female panel leg from springing open during uplift loads.
- B. Trims and Flashings: Material, metal thickness, and finish to match panels. Profiles indicated in Drawings.
- C. Panel Penetration Flashings: As recommended by panel manufacturer.
- D. Fasteners: Per manufacturer recommendation.
- E. Profile Closures: Polyethylene foam, die-cut or formed to panel configuration.
- F. Sealant for Field Application: See Section 07 92 00 "Joint Sealants".
- G. Insulation: See Section 07 21 00 "Thermal Insulation".
- H. Acoustic Insulation: See Section 09 81 00 "Acoustic Insulation".

2.5 FABRICATION

- A. Fabrication, General:
 1. Unless otherwise shown on Drawings or specified herein, fabricate panels in continuous lengths and fabricate flashings and accessories in longest practical lengths.
 2. Panels shall be factory correctively leveled.
- B. Fabrication Tolerances:
 1. Flat metal surfaces will display waviness commonly referred to as “oil canning”. This is caused by steel mill tolerances and is a characteristic, not a defect, of panels manufactured from light gauge metal. Panels are factory correctively leveled to minimize the occurrence of “oil canning”. As such, “oil canning” will not be accepted as cause for rejection.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: With Installer present.
 1. Examine conditions and substrates on which metal panels are to be installed. Structural support or substrate shall be flat and plumb to avoid panel stresses and distortion.
 2. Verify that air barrier work is complete and inspected.
 3. Prior to starting work, correct defects.
- B. Field Measurements:
 1. Coordinate field measurements and fabrication schedule with construction progress.
 2. Field measure prior to fabrication. Show recorded dimensions on shop drawings, including locations of shop-fabricated openings.
 3. If field measurements differ from drawing dimensions, notify Architect prior to fabrication.

- C. Substrate Tolerances: Deviations from flat plane shall not exceed the following.
 - 1. 1/4 inch in 20 feet vertically or horizontally.

3.2 PREPARATION

- A. Protection:
 - 1. Treat contacting surfaces of dissimilar materials to prevent electrolytic corrosion.
 - 2. Where panels or trim may come in contact with dissimilar materials or treated lumber, fabricate transitions to facilitate drainage and minimize possibility of galvanic corrosion.
 - 3. At points of contact with dissimilar metal or treated lumber, coat panel or trim with protective paint or separate materials with a weatherproof underlayment.
 - 4. Direct contact or run-off from CCA, ACQ, AC, or other treated lumber (outdoor wood) or fire retardant impregnated or treated wood shakes or siding can cause panels and trim to fail prematurely. Avoid contact with these materials.

3.3 INSTALLATION

- A. Secondary Framing: Install according to approved shop drawings and metal panel manufacturer's recommendations.
- B. Panels and Flashing:
 - 1. Install according to approved shop drawings.
 - 2. Comply with methods and recommendations of SMACNA Architectural Sheet Metal Manual for flashing configurations required.
 - 3. Overlap flashing at least 6 inches.
 - 4. Discrepancies between job site conditions and shop drawings shall be brought to the attention of the Architect for resolution.
 - 5. Cutting and Fitting:
 - a. Cut panels neat, square, and true with shearing action cutters. Torch or power saw cutting is prohibited.
 - b. Openings 6 inches and larger: Shop fabricate and reinforce to maintain original load capacity.
 - c. Openings less than 6 inches: Field cutting is acceptable.
- C. Accessories: Install trims, panel closures, flashings according to Drawings and manufacturer's recommended details.
- D. Sealant Installation: Apply according to approved shop drawings and SMACNA Architectural Sheet Metal Manual recommendations.

3.4 CLEANING

- A. Repairs:
 - 1. Touch up paint is not required for panels with scratches that do not expose metal.
 - 1. Panels or flashings with finish damage exposing metal or with substrate damage shall be replaced.
- B. Cleaning and Waste Management: At completion of each day's work and at work completion, sweep panels, flashings, and gutters clean. Do not allow fasteners, cuttings, filings, or scraps to accumulate.

END OF SECTION

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074243 – COMPOSITE WALL PANELS

PART I – 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 SECTION INCLUDES:

- A. Exterior, panelized fiber cement cladding system and accessories to complete a drained and back-ventilated rainscreen.

1.3. RELATED SECTIONS

- A. Section 054000 – Cold-Formed Metal Framing
- B. Section 061000 – Rough Carpentry
- C. Section 061600 – Sheathing
- D. Section 072100 – Thermal Insulation
- E. Section 072500 – Weather Barriers
- G. Section 079200 – Joint Sealants

1.4. REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 509-14 – Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems.
- B. ASTM International (ASTM):
 - 1. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 2. ASTM C 1185 - Standard Test Methods for Sampling and Testing Non-Asbestos Fiber Cement.
 - a. ASTM C 1186 – Standard Specification for Flat Fiber-Cement Sheets.
 - 3. ASTM E-84 - Standard Test for Surface Burning Characteristics of Building Materials.
 - 4. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 5. ASTM E 228 - Standard Test Method for Linear Thermal Expansion of Solid Materials with a Vitreous Silica Dilatometer.
 - 6. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

7. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

D. National Fire Protection Association (NFPA):

1. NFPA 285 - Fire Test Method for Exterior Wall Assemblies Containing Combustible Material.
2. NFPA 268 – Ignition Resistance of Exterior Wall Assemblies.

1.5. SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Submit manufacturer's product description, storage and handling requirements, and installation instructions.

C. Product Test Reports and Code Compliance: Documents demonstrating product compliance with local building code, such as test reports or Evaluation Reports from qualified, independent testing agencies

D. Manufacturer's Details: Submit drawings (.dwg, .rvt, and/or .pdf formats), including plans, sections, showing installation details that demonstrate product dimensions, edge/termination conditions/treatments, compression and control joints, corners, openings, and penetrations.

E. Samples: Submit samples of each product type proposed for use.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. All fiber cement panels specified in this section must be supplied by a manufacturer with a minimum of 10 years of experience in fabricating and supplying fiber cement cladding systems.

2. Provide technical and design support as needed regarding installation requirements and warranty compliance provisions.

B. Installer Qualifications: All products listed in this section are to be installed by a single installer trained by manufacturer or representative.

C. Mock-Up Wall: Provide a mock-up wall as evaluation tool for product and installation workmanship.

D. Pre-Installation Meetings: Prior to beginning installation, conduct conference to verify and discuss substrate conditions, manufacturer's installation instructions and warranty requirements, and project requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Panels must be stored flat and kept dry before installation. A waterproof cover over panels and accessories should be used at all times prior to installation. Do not stack pallets more than two high. Refer to the information included on each pallet.
- B. If panels are exposed to water or water vapor prior to installation, allow to completely dry before installing. Failure to do so may result in panel shrinkage at ship lap joints, and such action may void warranty.
- C. Panels MUST be carried on edge. Do not carry or lift panels flat. Improper handling may cause cracking or panel damage.
- D. Direct contact between the panels and the ground should be avoided at all times. It is necessary to keep panels clean during installation process.

1.8 WARRANTY

- A. Provide manufacturer's 15-year warranty against manufactured defects in fiber cement panels.
- B. Provide manufacturer's 15-year warranty against manufactured defects in panel finish.

PART 2: PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Manufacturer Nichiha Corporation, 18-19 Nishiki 2-chome Naka-ku, Nagoya, Aichi 460-8610, Japan.
- B. Basis of Design Manufacturer's Representative: Nichiha USA, Inc., 6465 E. Johns Crossing, Suite 250, Johns Creek, GA 30097. Toll free: 1.866.424.4421, Office: 770.805.9466, Fax: 770.805.9467, www.nichiha.com.
 - 1. Basis of Design Product: Nichiha VintageWood.
 - a. Profile colors: Bark, Cedar, Redwood, Ash, and Spruce.
 - b. Profiles: Wood plank texture with three, 3/8" grooves running lengthwise, spaced 5-5/8" apart.
 - c. Accessory/Components:
 - i. Aluminum trim options: Open Outside Corner, J-Mold, Inside Corner
 - ii. Essential Flashing System: Starter, Overhang.
 - 1. Finish: Color and finish as selected by Architect.
 - d. Dimensions:
 - 1. AWP-1818: 455mm (17-7/8") (h) x 1,818 mm (71-9/16") (l).
 - e. Panel Thickness: 16 mm (5/8").
 - f. Weight: AWP-1818: 35.27 lbs. per panel.
 - g. Coverage: 8.88 sq. ft. per panel (1818).
 - h. Factory sealed on six [6] sides.

- D. Requests for substitutions will be considered in accordance with provisions of Section 016000.

2.2 MATERIALS

COMPOSITE WALL PANELS

- A. Fiber cement panels manufactured from a pressed, stamped, and autoclaved mix of Portland cement, fly ash, silica, recycled rejects, and wood fiber bundles.
- B. Panel surface pre-finished and machine applied.
- C. Panels profiled along 1818mm edges so that the long joints between the installed panels are ship lapped.
- D. Factory-applied sealant gasket added to top panel edge; all 1818mm edge joints contain a factory sealant.

2.3 PERFORMANCE REQUIREMENTS:

- A. Fiber Cement Cladding – Must comply with ASTM C-1186, Type A, Grade II requirements:
 - 1. Wet Flexural Strength: Result: 1418 psi, Lower Limit: 1015 psi.
 - 2. Water Tightness: No water droplets observed on any specimen.
 - 3. Freeze-thaw: No damage or defects observed.
 - 4. Warm Water: No evidence of cracking, delamination, swelling, or other defects observed.
 - 5. Heat-Rain: No crazing, cracking, or other deleterious effects, surface or joint changes observed in any specimen.
- B. Mean Coefficient of Linear Thermal Expansion (ASTM E-228): Max 1.0×10^{-5} in./in. F.
- C. Surface Burning (ASTM E-84): Flame Spread: 0, Smoke Developed: 0.
- D. Wind Load (ASTM E-330):
 - 1. Minimum lateral deflection: L/120.
- E. Water Penetration (ASTM E-331): No water leakage observed into wall cavity.
- F. Steady-State Heat Flux and Thermal Transmission Properties Test (ASTM C-518).
- G. Fire Resistant (ASTM E-119).
- H. Ignition Resistance (NFPA 268).
- I. Fire Propagation (NFPA 285).
- J. Drained and Back Ventilated Rainscreen (AAMA 509-14): System classifications: W1, V1.

2.4 INSTALLATION COMPONENTS

- A. Ultimate Clip System:
 - 1. Starter Track:
 - a. Horizontal Panel Installations - FA 700 – 3,030mm (l) galvalume coated steel.
 - 2. Panel Clips: JEL 778 “Ultimate Clip II” (10mm rainscreen for 16mm AWP) – Zinc-Aluminum-Magnesium alloy coated steel.
 - a. Joint Tab Attachments (included) – used at all AWP-1818 panel to panel vertical joints.

3. Corner Clips: JE 777C (10mm rainscreen for 5/8" AWP Manufactured Corners) -- Zinc-Aluminum-Magnesium alloy coated steel.
 4. Single Flange Sealant Backer – FHK 1015 R (10mm) – 6.5' (l) fluorine coated galvalume.
 5. Corrugated Spacer – FS 1005 (5mm), FS 1010 (10mm) – 4' (l).
- B. Aluminum Trim: Paint primed trim.
- C. Essential Flashing System:
1. Starter – main segments (1818mm), inside corners, outside corners
 2. Overhang – main segments (1818mm), inside corners, outside corners, joint clips
- D. Fasteners: Corrosion resistant fasteners, hot-dipped galvanized screws. Follow manufacturer's instructions for appropriate fasteners for construction method used.
- E. Flashing: Flash all areas specified in manufacturer's instructions. Do not use raw aluminum flashing. Flashing must be galvanized, anodized, or PVC coated.
- F. Sealant: Sealant shall comply with ASTM C920, Class 35.

PART 3: EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
1. Allowable stud spacing: 16" o.c. maximum.
 2. A weather resistive barrier is required when installing fiber cement panels. Use an approved weather resistive barrier (WRB) as defined by the 2017 OBC.
- B. Examine site to ensure substrate conditions are within alignment tolerances for proper installation.
- C. Do not begin installation until unacceptable conditions have been corrected.
- D. Do not install panels or components that appear to be damaged or defective. Do not install wet panels.

3.2 TOLERANCE

- A. Wall surface plane must be plumb and level within +/- ¼ inch in 20 feet in any direction.
1. One layer of Nichiha 5mm (~3/16") Spacer may be used as shim.

3.3 INSTALLATION

- A. General: Install products in accordance with the latest installation guidelines of the manufacturer and all applicable building codes and other laws, rules, regulations and ordinances. Review all manufacturer installation, maintenance instructions, and other applicable documents before installation.

B. Panel Cutting

1. Always cut fiber cement panels outside or in a well-ventilated area. Do not cut the products in an enclosed area.
2. Always wear safety glasses and OSHA approved respirator whenever cutting, drilling, sawing, sanding or abrading the products. Refer to manufacturer SDS for more information.
3. Use a dust-reducing circular saw with a diamond-tipped or carbide-tipped blade per manufacturer's recommendations.
4. Silica Dust Warning: Fiber cement products may contain some amounts of crystalline silica, a naturally occurring, potentially hazardous mineral when airborne in dust form. Consult product SDS or visit <https://www.osha.gov/dsg/topics/silicacrystalline/>.
5. Immediately clean dust from cut panels as it may bind to the finish.

3.4 CLEANING AND MAINTENANCE

- A. Review manufacturer guidelines for detailed care instructions.

END OF SECTION 074243

SECTION 074646 - FIBER-CEMENT SIDING AND SOFFIT

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 fiber-cement soffit and trim boards.
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for wood furring, grounds, nailers, and blocking.
 - 2. Section 072100 "Thermal Insulation" for sheathing.
 - 3. Section 072500 "Weather Barriers" for weather-resistive barriers.
 - 4. Section 074800 "Rainscreen Attachment System".

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Submit shop drawings showing trim details required of the manufacturer to maintain the warranty of the products.
- C. Installation of additional trim other than what is shown on the drawings due to the selected manufacturer is the responsibility of the installing contractor.
- D. Samples for Initial Selection: For fiber-cement siding and soffit including related accessories.
- E. Samples for Verification: For each type, color, texture, and pattern required.
 - 1. 12-inch- (300-mm-) long-by-actual-width Sample of siding.
 - 2. 12-inch- (300-mm-) long-by-actual-width Sample of soffit.
 - 3. 12-inch- (300-mm-) long-by-actual-width Samples of trim and accessories.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of fiber-cement siding and soffit.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding.
- C. Research/Evaluation Reports: For each type of fiber-cement siding required, from ICC-ES.
- D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish full lengths of fiber-cement soffit including related accessories, in a quantity equal to 2 percent of amount installed.

1.8 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
 - 1. Build mockup of typical wall area as shown on Drawings.
 - 2. Build mockups for fiber-cement siding and soffit including accessories.
 - a. Size: 48 inches (1200 mm) long by 60 inches (1800 mm) high.
 - b. Include outside corner on one end of mockup and inside corner on other end.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with labels intact until time of use.
- B. Store materials on elevated platforms, under cover, and in a dry location.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including cracking and deforming.
 - b. Deterioration of materials beyond normal weathering.
 - 2. Warranty Period: 25 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain products, including related accessories, from single source from single manufacturer.
 - 1. James Hardie – Hardie Plank (Basis of Design)
 - 2. Georgia Pacific
 - 3. GAF
 - 4. Wolverine Siding Systems

2.2 FIBER-CEMENT SOFFIT

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
- B. Nominal Thickness: Not less than 5/16 inch (8 mm).
- C. Pattern: 16-inch, 24-inch, and 48-inch-wide sheets with smooth texture.
- D. Ventilation: Provide perforated soffit in 16-inch and 24-inch wide where indicated.
- E. Color Selection: As selected by Architect from manufacturers full range of colors.

2.3 ACCESSORIES

- A. Fasteners:
 - 1. For fastening to wood, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1 inch (25 mm) into substrate.
 - 2. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1/4 inch (6 mm), or three screw-threads, into substrate.
 - 3. For fastening fiber cement, use hot-dip galvanized fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement siding and soffit and related accessories.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
 - 1. Do not install damaged components.
 - 2. Install proper fasteners at spacing and recommendation of the manufacturer.
- B. Install joint sealants as specified in Section 079200 "Joint Sealants" and to produce a weathertight installation.

3.4 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074646

SECTION 07 48 00 – RAINSCREEN ATTACHMENT SYSTEM (CI™ SYSTEM)

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. Provide a thermally broken, rainscreen attachment system for attachment of exterior cladding Aluminum Composite Material installed over continuous exterior insulation.

- B. Related Sections:

1. Refer to Division 05 Section “Steel Stud Framing”.
2. Refer to Division 07 Section “Air Barrier”
3. Refer to Division 07 Formed Metal Wall Panels.

1.3 SYSTEM DESCRIPTION

- A. System assembly shall include the following components from the substrate out:

1. Spray polyurethane foam (applied to interior wall cavity for steel stud wall framing).
2. Substrate: Wall framing assembly
3. Weather Resistant/Air Barrier over continuous insulation.
4. Continuous insulation.
5. Thermally broken rainscreen attachment system.
6. Exterior cladding.

- B. Design Requirements:

1. Manufacturer is responsible for designing system, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
2. Employ registered professional engineer, licensed to practice engineering in jurisdiction where Project is located, to engineer each component of rainscreen attachment system.

3. Structural Design: Exterior-insulated rainscreen wall assembly capable of withstanding effects of load and stresses from dead loads, wind loads, ice loads (if applicable) as indicated on Structural General Notes on Structural Drawings, and normal thermal movement without evidence of permanent defects of assemblies or components.
 - a. Thermal Movements: Provide assemblies that allow for thermal movements resulting from the following maximum ambient temperatures by preventing overstressing of components and other detrimental effects:
 - 1) Temperature Change (range): 120 degrees Fahrenheit (67 degrees C), ambient:
4. Support Framing/Attachment System:
 - a. No framing component may penetrate the layer of continuous exterior insulation other than thermally isolated fasteners.
 - b. Frequency and spacing of stiffened horizontal girts as indicated by manufacture in project specific engineering package.

C. Performance Requirements:

1. Rainscreen Attachment System Performance: Comply with ANSI/ASHRAE 90.1-2010 definition of continuous insulation (c.i.).
2. No thermal bridges other than fasteners and service openings.
3. Thermal Performance:
 - a. Full constructed assembly must have a minimum 95% EFFECTIVE R-value when compared to the exterior continuous insulations rated R-Value.
 - b. Continuous framing profiles (including C- or Z-shaped sections or furring) penetrating insulation not allowed.
 - c. Perform effective R-Value calculation or modeling in accordance with ASHRAE guidelines.
4. Structural Performance:
 - a. Wind Load Performance – Attachment system must show the following results when tested in accordance with ASTM E330-02.
 - 1) 90 pound per square foot negative and positive pressure held for 60 seconds, system components shall not experience failure or gross permanent distortion.
 - 2) 135 pound per square foot negative and positive pressure held for 10 seconds, system components shall not experience failure or gross permanent distortion.

- b. Wind cycling (air pressure cycling) performance – Attachment system must show conformance to the following results when tested in accordance with ASTM E1886-05.
 - 1) A total of 4,500 air pressure cycles. Cycles must include 50 cycles at a maximum pressure of 90 pounds both positive and negative. Average cycle time must not be less than 3.25 seconds for both negative and positive cycles. Cladding weight supported during test must be a minimum of 11.5 pounds per square foot. No damage or deformation must be seen at end of test.
 - c. Gravity load (dead load) performance – Attachment system must demonstrate resistance to deflection under shear loading, applied parallel to the wall assembly and directly to the attachment system. Testing must be conducted using calibrated equipment by an IAS accredited third party laboratory. Deflection not to exceed 0.050 inches at 150 pounds per square foot.
5. Framing Members:
- a. Test framing components to AAMA TIR- A8-[04] – Section 7.2 to determine structural performance and effective moment of inertia for each perforated component. Minimum Effective Moment of Inertia: 0.0066 in⁴.
 - b. Localized bending stress for eccentrically loaded framing members must be evaluated with the maximum effective length of resisting element not more than 12 inches.
6. Fasteners:
- a. Minimum Safety Factor of 3 for both tension and shear values
 - b. Combined tension and shear shall be evaluated according to an interaction formula. Sum of terms shall not exceed 1.0.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer’s product literature and descriptions of testing performed on system components to indicate meeting or exceeding specified performance.
- B. Shop Drawings:
 - 1. Submit connection details to the cladding manufacturer, showing interface of rainscreen attachment system to substrate and panels with adjacent construction, signed and sealed by Professional Engineer.
 - 2. Show system installation and attachment, including fastener size and spacing.
- C. Structural Calculations:

1. Submit rainscreen attachment manufacturer's comprehensive Structural Design analysis signed and sealed by a Professional Engineer.
- D. Samples: Submit following material samples for verification:
1. Vertical Girts: Two (2) 12-inch-long samples.
 2. 2'' PanelRail: Two (2) 12-inch-long samples
- E. Test Reports:
1. Test to the following standards and provide written test reports by a third party:
 - a. AAMA TIR-A8-[04]: Structural Performance of Composite Thermal Barrier Framing Systems – Section 7.2
 - b. ASTM E330
 - c. ASTM E1233
 - d. Gravity load test report, performed by IAS accredited third party
 2. Comprehensive three-dimensional thermal modeling report indicating framing systems impact on exterior insulation rated R-value.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
1. Minimum 5 years' experience specializing in the manufacturing of façade attachment/support framing similar to those specified.
 2. Ability to demonstrate conformance to testing requirements.
- B. Installer Qualifications:
1. Minimum of 3 years' documented experience or minimum of 5 completed projects of equivalent scope and quality and recommended by manufacturer to perform work of this Section.
 2. Onsite superintendent or foreman overseeing installation on site during entire work of this Section with experience equivalent to installer and in good standing with the manufacturer.
- C. Engineer Qualifications: Registered professional engineer experienced in the design of curtain wall systems, anchors, fasteners and licensed to practice engineering in the jurisdiction where Project is located.
- D. Pre-Installation Meeting:
1. Discuss sequence and scheduling of work and interface with other trades.

2. Review metal wall framing assemblies for potential interference and conflicts and coordinate layout and support provisions for interfacing work.
 3. Review and document methods, procedures and manufacturer's installation guidelines and safety procedures for exterior wall assembly.
- E. Mock-Ups: Coordinate mock-up materials and requirements with mock-up specified in Division 01.

1.6 QUALITY CONTROL

- A. Single source responsibility:
1. Furnish engineered rainscreen attachment system components under direct responsibility of single manufacturer.
- B. Field Measurements: Verify actual supporting and adjoining construction before fabrication.
- C. Record field measurements on project record shop drawings.
- D. Established Dimensions: Where field measurements cannot be made without delaying work, guarantee dimensions and proceed with fabrication of rainscreen attachment system corresponding to established dimensions.
- E. Perform water testing prior to installation of exterior finishes.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials and components in manufacturers' original, unopened and undamaged containers or bundles, fully identified. Exercise care to avoid damage during unloading, storing and installation.
- B. Store, protect and handle materials and components in accordance with manufacturer recommendations to prevent damage, contamination and deterioration. Keep materials clean, dry, and free of dirt and other foreign matter, and protect from damage due to weather or construction activities.

1.8 SEQUENCING

- A. Ordering: Comply with manufacturers' ordering instructions and lead time requirements to avoid construction delays.
- B. Coordinate construction to ensure that assemblies fit properly to supporting and adjoining construction; coordinate schedule with construction in progress to avoid delaying work.

1.9 WARRANTY

- A. Manufacturer Warranties:

1. Attachment System: Ten (10) year Limited Warranty.
 - a. Covers components of the attachment system, including structural failure of components when all the materials and components are supplied and installed per manufacturer's requirements.
 - b. Includes labor and material for removal and replacement of defective material.
 - c. Includes labor to remove and reinstall façade finish panels, finish closures and façade finish accessories necessary to access defective material.
- B. Contractor's Warranties: 2-year labor warranty, starting from date of Substantial Completion, to cover repair of materials found to be defective as a result of installation errors.
- C. Limitation of Warranties: Exclude repairs, replacement, and corrective work to the substrate, primary structure, finish panels, and/or property – unless otherwise noted above. Warranties exclude mechanical damage due to abuse, neglect, primary structure failure, or forces of nature greater than normal weather conditions.

1.10 MAINTENANCE

- A. Extra Materials: For use by Owner in building maintenance and repair, provide 3 percent additional rainscreen attachment components in new, unopened cartons, packaged with protective covering for storage and identified with appropriate labels.

PART 2 - PRODUCTS

2.1 RIGID INSULATION

- A. Refer to Section 07 21 00 – Thermal Insulation.

2.2 RAINSCREEN ATTACHMENT/SUPPORT FRAMING SYSTEM

- A. Comply with ANSI/ASHRAE 90.1-2010 definition of continuous insulation (c.i.).
- B. Coating Material: ASTM A1046, Zinc-Aluminum-Magnesium, minimum thickness ZM40.
 1. ASTM A653 Galvanized steel is not acceptable.
- C. Steel Classification: Structural Steel (SS), Grade 50, 50 ksi Yield.
- D. Spacing: Comply with manufacturer's Professional Engineers calculations.

E. Vertical Girt: Vertical girt with pre-punched attachment holes, directly attached on top of rigid insulation directly to substrate at regular spacing, with engineered thermally isolated washer assembly and fasteners.

1. Steel Thickness: Minimum 0.046-inch thick (18 gauge).
2. Profile Depth: 0.75 inches.
3. Girt Fastening Face, Width: 2-inches.
4. 2'' Horizontal PanelRail
5. Basis of Design: CI™ by Knight Wall Systems.
6. Or approved equal.

F. Fasteners:

1. Sufficient length to provide solid attachment through rigid insulation to structure as required by manufacturer.
2. Thermal Isolating Washers: Minimum 0.125 inch thick Polyoxymethylene copolymer (POM) washers with integral centering lip to act as a thermal break between wall anchor fasteners and girt.
 - a. Tensile Yield Strength: 9.57 ksi per ISO 527
 - b. Melting Temperature: 329 degrees Fahrenheit per ISO 3146
 - c. Basis of Design: ThermaStop™ Isolator by Knight Wall Systems.
 - d. Or approved equal.
3. Steel stud framing substrate: Self-drill hex-washer-head stainless steel with 1,000 hour salt-spray rated thermoset polyester coating.
 - a. Embedment depth: 0.625 inches or three full threads minimum, whichever is greater.
 - b. Minimum ultimate pull-out capacity from 18 gauge steel: 450 pounds.

G. Accessories:

1. Galvanic Protection: Utilize tapes and other methods as necessary to separate and prevent contact between dissimilar metals.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with manufacturer requirements for installation conditions affecting performance of the work.

1. Verify that metal wall studs, opening framing, bridging, bracing and other framing support members and anchorage have been installed within thermal wall system alignment tolerances and requirements.
 2. Do not proceed with installation until unsatisfactory conditions have been corrected.
 3. Ensure weather-resistant barrier (WRB) and rigid insulation is installed prior to installing rainscreen attachment system.
 4. Ensure fenestration, transitions, discontinuities, sills, and ledgers are flashed and sealed to move moisture to the exterior of the building.
- B. Field verify architectural details and mechanical and electrical requirements prior to commencing installation.
- C. Commencement of installation constitutes acceptance of existing conditions and acceptance of responsibility for satisfactory performance.

3.2 RAINSCREEN ATTACHMENT SYSTEM INSTALLATION

A. Preparation:

1. Verify vertical girt spacing and framing clearances relative to studs or other points of attachment.
2. Verify vertical girt does not cantilever past rigid insulation.

B. Installation

1. Install vertical girts in vertical orientation in strict accordance with manufacturer's installation instructions.
2. Do not use shims to plumb the wall between the vertical girt and insulation.
3. Minimum length of installed cut girt is 24-inches and shall be attached with at least two (2) fasteners.
4. Mount box girts, fastened up to 32 inches on center (as determined by the manufactures engineering calculations) over installed rigid insulation, using one wall anchor per pre-punched attachment hole at spacing indicated on engineering calculations.
 - a. Check plumb of vertical girts both parallel and perpendicular to the structure.
 - b. Tighten screws that attach vertical girt through insulation to substructure to a snug tight condition and not stripped. Do not over-torque beyond manufacturer's recommendation. If installed using hand tools, verify for each installer at beginning of project using snug-tight criteria. Do not use stripped holes.

- c. Where obstructions are present and unavoidable (i.e. window openings), use laser or chalk line to restart girt.
 - d. Locate vertical girt at jamb conditions and outside corner conditions.
 - e. Use shearing instruments (i.e. snips, nibbler, etc.) for cutting metal framing components. Saws are not recommended, as the sparks produced during cutting will damage the anti-corrosion coating. If sparks are generated during cutting, be sure the portion of the component to be installed on the building is protected from sparks and that any stockpile near the cutting station is also protected.
 - f. The systems components should not be cut while installed on the building, unless using a shearing instrument.
 - g. Replace thermal isolator pieces that break during installation.
 - h. Provide a 3/8" – 1/2" gap between girts for expansion when multiple lengths of vertical girts are installed.
5. Attach secondary horizontal rails to vertical girts plumb, straight and square.
- a. Tighten screws to a snug tight condition and not stripped. Do not use stripped holes or screws.
 - b. Shims can be used between horizontal rail and vertical girt or cladding panel and horizontal rail (if approved by cladding manufacturer). Shims cannot be used between vertical girt and insulation.
 - c. Both flanges/edges of stiffened horizontal rail must be attached to vertical girt.

3.3 SPRAY INSULATION

- A. Fully secure exterior insulation prior to spray foam (SPF) within stud cavity to prevent deformation of exterior insulation due to expansion of SPF.

3.4 SIDING/CLADDING PANEL INSTALLATION – REFER TO SECTION 074213.

- A. The cavity must be clear and free from air flow and drainage obstructions.

END OF SECTION 07 48 00

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SECTION 078413 - PENETRATION FIRESTOPPING

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. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 or UL 1479:
 - 1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
 - 2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - a. Penetrations located outside wall cavities.
 - b. Penetrations located outside fire-resistance-rated shaft enclosures.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application at the end of Part 3 that are produced by one of the following manufacturers:
 - 1. 3M Company.
 - 2. Hilti Corp.
 - 3. Tremco Inc.
 - 4. Specified Technologies Inc.

2.2 FIRESTOPPING ASSEMBLIES - MATERIALS

- A. General
- B. VOC Content: Provide penetration firestopping that complies with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Architectural Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrate and the items penetrating the firestopping.
- D. Accessories: Use components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance rated system. Accessories include but are not limited to
 - 1. Permanent forming/damming/backing materials
 - a. Temporary forming materials
 - b. Substrate primers
 - c. Collars
 - d. Sleeves
- E. Firestopping at Uninsulated Metallic Pipe and Conduit Penetrations, of diameter 4 inches or less:
 - 1. 3M; Fire Barrier CP25

2. Hilti; CP 601S Elastomeric Firestop Sealant
 3. Tremco; Tremstop IA
 4. STI; SpecSeal Sealant SSS
- F. Firestopping at Combustible Pipe and Conduit Penetrations, of diameter 4 inches or less:
1. 3M; Fire Barrier FS-195 Wrap Strip
 2. Hilti; FS-ONE High Performance Intumescent Firestop Sealant
 3. Tremco; Tremstop WS
 4. STI; Wrap Strip SSW
- G. Firestopping at Electrical outlet boxes in gypsum wallboard assemblies
1. 3M; Fire Barrier Moldable Putty Pad MPP
 2. Hilti; CP617 Firestop Putty Pad
 3. Tremco; Tremstop MP Putty Pad
 4. STI; Spec Seal SSP Putty Pad
- H. Firestopping at Cable Tray Penetrations multiple steel and copper pipes, electrical busways in raceways:
1. 3M; Fire Barrier CS-195 Composite Strip
 2. Hilti; FS 635 Trowelable Firestop Compound
 3. Tremco; Fyre-Sil and Fyre-Sil S/L
 4. STI; SpecSeal lightweight mortar SSM
- I. Firestopping at Control Joint (without Penetrations):
1. 3M; (Dow Corning Fire Stop Sealant 2000)
 2. Hilti; FS 601 S Elastomeric Firestop Sealant
 3. Tremco; Tremstop DS
 4. STI; ES Elastomeric Sealant
- J. Firestopping at head of walls without penetrations
1. 3M; Fire Barrier Spray 100
 2. Hilti; CP 672 Speed Spray
 3. Tremco; Tremstop Acrylic SP
 4. STI; AS200

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. Include the following information on labels:
1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 4. Date of installation.

5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

3.5 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

3.6 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

| THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE | | | | | | |
|---|--|---|----------------------|--|---|---------------------|
| FIRESTOP SYSTEMS ARE LISTED USING THE ALPHA-ALPHA-NUMERIC IDENTIFICATION SYSTEM PUBLISHED IN UL'S <i>FIRE RESISTANCE DIRECTORY</i>, VOL. 2 | | | | | | |
| Type of Penetrant | Construction | | | | | |
| | Floor Penetration Systems (First Alpha Component = C or F) | | | Wall Penetration Systems (First Alpha Component = C or W) | | |
| | Concrete Floors with a Minimum Thickness Less than or Equal to 5 Inches | Concrete Floors with a Minimum Thickness Greater than 5 Inches | Framed Floors | Concrete or Masonry Walls with a Minimum Thickness Less than or Equal to 8 Inches | Concrete or Masonry Walls with a Minimum Thickness Greater than 8 Inches | Framed Walls |
| No Penetrating Items | C-AJ-0001-0999 or F-A-0001-0999 | C-BJ-0001-0999 | | C-AJ-0001-0999, C-BJ-0001-0999, or W-J-0001-0999 | | W-L-0001-0999 |
| Metallic Pipe, Conduit, or Tubing | C-AJ-1001-1999 or F-A-1001-0999 | C-BJ-1001-1999, C-BK-1001-1999, or F-B-10010-1999 | F-C-1001-1999 | C-AJ-1001-1999, C-BJ-1001-1999, or W-J-1001-1999 | C-BK-1001-1999 or W-K-1001-1999 | W-L-1001-1999 |
| Nonmetallic Pipe, Conduit, or Tubing | C-AJ-2001-2999 or F-A-2001-2999 | C-BJ-2001-2999 or F-B-2001-2999 | F-C-2001-2999 | C-AJ-2001-2999, C-BJ-2001-2999, or W-J-2001-2999 | | W-L-2001-2999 |
| Electrical Cables | C-AJ-3001-3999 or F-A-3001-3999 | C-BJ-3001-3999 or F-B-3001-3999 | F-C-3001-3999 | C-AJ-3001-3999, C-BJ-3001-3999, or W-J-3001-3999 | | W-L-3001-3999 |
| Cable Trays With Electrical Cables | C-AJ-4001-4999 or F-A-4001-4999 | C-BJ-4001-4999 | | C-AJ-4001-4999, C-BJ-4001-4999, or W-J-4001-4999 | W-K-4001-4999 | W-L-4001-4999 |
| Insulated Pipes | C-AJ-5001-5999 or F-A-5001-5999 | C-BJ-5001-5999 | F-C-5001-5999 | C-AJ-5001-5999 or W-J-5001-5999 | | W-L-5001-5999 |
| Miscellaneous Electrical Penetrants | C-AJ-6001-6999 or F-A-6001-6999 | | | C-AJ-6001-6999 | | W-L-6001-6999 |
| Miscellaneous Mechanical Penetrants | C-AJ-7001-7999 | | F-C-7001-7999 | C-AJ-7001-7999 or W-J-0001-0999 | | W-L-7001-7999 |
| Groupings of Penetrations | C-AJ-8001-8999 or F-A-8001-8999 | C-BJ-8001-8999 | F-C-8001-8999 | C-AJ-8001-8999, C-BJ-8001-8999, or W-J-8001-8999 | | W-L-8001-8999 |
| | | | | | | |

For each location where a fire-resistance-rated floor or wall assembly is penetrated, provide a UL-listed through-penetration firestop system selected from the applicable UL number range listed above that complies with Section 078413 - Penetration Firestopping and is suitable for the penetration conditions indicated for the Project.

END OF SECTION 078413

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SECTION 079200 - JOINT SEALANTS

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. Silicone sealants.
- 2. Urethane sealants.
- 3. Latex sealants.
- 4. Acoustic sealants.

- B. Related Sections:

- 1. Division 32 Section "Concrete Paving Joint Sealants" for sealing joints in pavements, walkways, and curbing.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated, including manufacturer's specifications and installation instructions for each type of sealant, caulking compound and associated miscellaneous material required.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 2. When joint substrates are wet.
 3. Where joint widths are greater or lesser than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
1. Architectural Sealants: 250 g/L.
 2. Nonmembrane Roof Sealants: 300 g/L.
 3. Single-Ply Roof Membrane Sealants: 450 g/L.
 4. Sealant Primers for Nonporous Substrates: 250 g/L.
 5. Sealant Primers for Porous Substrates: 775 g/L.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range and verified in the field under actual conditions prior to full installation.

2.2 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

2.3 SILICONE SEALANTS

- A. Single-Component Mildew-Resistant Acid or Moisture Curing Silicone Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT, substrates G, A, O.
 - 1. Products:
 - a. Dow Corning Corporation; 786 Mildew Resistant.
 - b. GE Silicones; Sanitary SCS1700.
 - c. Pecora Corporation; 860.
 - d. Tremco; Tremsil 200.
 - 2. Typical Location/Joint Construction: Interior joints of ceramic tile at toilet rooms, showers, kitchens and chemical resistant casework applications.

2.4 URETHANE SEALANTS

- A. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pecora Corporation; Dynatrol I-XL.
 - b. Sika Corporation; Sikaflex - 1a.
 - c. Tremco Incorporated; Dymonic.
 - 2. Typical Location/Joint Construction: Exterior and interior joints in vertical surfaces of concrete and masonry, between concrete masonry and stone, between metal and concrete, masonry or stone. Interior and exterior perimeter joints of metal frames in exterior walls.
- B. Single-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pecora Corporation; DynaTrol II-SG.
 - b. Sika Corporation; Sikaflex - 1CSL.
 - c. Tremco Incorporated; Vulkem 45 SSL.

2. Typical Location/Joint Construction: Exterior and interior joints in horizontal surfaces of concrete; between metal and concrete, stone and masonry.

2.5 LATEX SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pecora Corporation; AC-20+.
 - b. Sonneborn; Sonolac.
 - c. Tremco Incorporated; Tremflex 834.
 2. Typical Location/Joint Construction: Interior joints at perimeter of hollow metal door frames in gypsum board, plaster, concrete, concrete masonry and casework applications.

2.6 ACOUSTICAL SEALANTS

- A. One part, nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pecora Corporation; AC-20.
 - b. Tremco; Acoustical Sealant.
 - c. USG; Acoustical Sealant.

2.7 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; 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.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C: closed-cell material with a surface skin as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.

- b. Glass.
 - c. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
- 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
- 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

- F. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, 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.
- G. Install sealant in wall control joints and expansion joints the full height of the wall including wall continuation above ceilings; interior and exterior wall locations.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

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08

OPENINGS

DIVISION

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SECTION 081113 - 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 hollow metal doors and frames.

- B. Related Sections:

- 1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
 - 2. Division 08 Section "Door Hardware (Scheduled by Describing Products)" for door hardware for hollow metal doors.
 - 3. Division 09 Sections "Interior Painting" for field painting hollow metal doors and frames.
 - 4. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating and finishes.
- B. Shop Drawings: Show the following:
 - 1. Elevations of each door design.
 - 2. Details of doors including vertical and horizontal edge details.
 - 3. Frame details for each frame type including dimensioned profiles.
 - 4. Details of each different wall opening condition.
 - 5. Details of anchorages, joints, field splices, and connections.
 - 6. Details of accessories.
 - 7. Details of moldings, removable stops, and glazing.
 - 8. Details of conduit and preparations for power, signal, and control systems.

9. Details and coordination of glazing frames and stops with glass and glazing requirements.
10. Provide 3-D isometric shop drawings from Hollow Metal Door and Frame manufacturer.

- C. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.
- B. Steel Door and Frame Standard: Comply with ANSI A250.8, unless more stringent requirements are indicated.
- 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 UL 10C.
- 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 UL 9. Label each individual glazed lite.

1.6 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 nonvented plastic.
 1. Provide additional protection to prevent damage to finish of factory-finished units.
- 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.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 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.

1.9 WARRANTY

- A. Manufacturer's Extended Express Warranty: Manufacturer's standard form in which the manufacturer agrees to replace doors and frames that fail in material or workmanship within specified warranty period.
 - 1. The manufacturer shall replace at no cost to the Owner, hollow metal doors and frames; which fail in materials or workmanship within 2 years of substantial completion.
 - 2. Failure of materials or workmanship shall include, but not limited to, failures in operations of doors and hardware, excessive leakage or air infiltration, excessive deflections, deterioration of finish or metal in excess of normal weathering and defects in accessories, weather stripping and other components of the work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Amweld Building Products, LLC.
 - 2. Ceco Door Products; an Assa Abloy Group company.
 - 3. Curries Company; an Assa Abloy Group company.
 - 4. Steelcraft; an Ingersoll-Rand company.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008, Drawing Steel, Type B; stretcher-leveled standard flatness.
- A. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- A. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 metallic coating.
- B. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
- C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M, Class C or D as applicable.
- D. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- E. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum

flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

- F. Glazing: Refer to Division 08 Section "Glazing."
- G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide doors of sizes, thicknesses, and designs indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
 - 1. Design: Flush and Embossed panel as indicated.
 - a. Embossed Panel Doors: Provide doors of sizes, thicknesses, and designs indicated. Stainable embossed doors shall be constructed of 16 ga. galvanized steel, same as flush door construction except doors shall be fabricated from steel that has an embossed oak wood grain pattern extending the full height and width of the door. The wood grain embossment shall be a minimum of .005-inches deep. Applied grain pattern or material shall not be permitted. Prime the cleaned and phosphatized wood grain face sheets with a stain absorbing primer. Stain door faces and edges with stain color selected by the Architect. Clear coat door after staining. Ship doors to jobsite adequately protected to prevent damage to the door and finish.
 - 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core. Honeycomb material shall have a crushing strength not less than 4000 psf and the lamination shall withstand not less than 1100 psf in shear.
 - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 - b. Insulated Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
 - 1) Locations: Exterior doors.
 - 3. Vertical Edges for Single-Acting Doors: Beveled edge.
 - a. Beveled Edge: 1/8 inch in 2 inches.
 - 4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.
 - 5. Top and Bottom Edges: Closed with flush or inverted min. 16 ga., end closures or channels of same material as face sheets.
 - 6. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 - 1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).
- C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 - 1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- A. Exterior Frames: Fabricated from metallic-coated steel sheet.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames as full profile welded unless otherwise indicated.
 - 3. Frames for Level 3 Steel Doors: 14 ga. steel sheet.
- B. Interior Frames: Fabricated from cold-rolled steel sheet.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames as full profile welded for new construction. Provide Knocked down frames for existing construction in renovation areas.
 - 3. Frames for Level 3 Steel Doors: 14 ga.
 - 4. Frames for Wood Doors: 16 ga. (14 ga. for openings over 4'-0" in width)
 - 5. Frames for Borrowed Lights: 16 ga.
- C. Hardware Reinforcement: ANSI/SDI A250.6.
- D. Head Reinforcement: Provide minimum 12 ga. steel channel or angle stiffener for opening widths more than 48 inches.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 16 ga., with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.156 inch thick.
 - 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 16 ga.

- B. Floor Anchors: Formed from same material as frames, not less than 14 ga., and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
 - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.6 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 18 ga., same material as door face sheet.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 16 ga., same material as frames.

2.7 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding.
- B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch-wide steel.
- C. Grout Guards: Formed from same material as frames, not less than 26 ga.

2.8 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. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- C. Hollow Metal Doors:
 - 1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 - 2. Glazed Lites: Factory cut openings in doors.
 - 3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
- D. Hollow Metal Frames: Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as doorframe. Fasten members at crossings and to jambs by butt-welding.
3. Provide countersunk, flat or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted to close off interior of openings where mortar or other materials might obstruct hardware operation.
5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
6. 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 more than 42 inches wide and mounted in metal-stud partitions.
7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated 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 doors and frames to receive nontemplated, 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 electrical Sections. For electrified frames, provide with flex conduit and power transfer to have back box for conduit to land onto.
- G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 4. Provide loose stops and moldings on inside of hollow metal work.
 5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.9 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
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; compatible with substrate and field-applied coatings despite prolonged exposure.

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. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- 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 squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
- D. Frames that are bowed, twisted or otherwise unacceptable shall be removed from the jobsite and replaced with properly constructed frames.

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.
1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable glazing stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that are filled with grout.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 6. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for

- securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
7. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch measured at jambs at floor.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Finish Floor: Maximum 3/4 inch.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
1. Secure stops with countersunk flat or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

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 Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

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. Solid-core doors 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. Division 08 Section "Glazing" for glass view panels in flush wood doors.
2. Division 08 Section "Door Hardware" for door hardware in flush wood doors.

1.3 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction, trim for openings, and 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 Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
2. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Source Limitations: Obtain flush wood doors from single manufacturer.
- C. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
 - 1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
 - 2. Provide WI-Certified Compliance Certificate indicating that doors comply with requirements of grades specified.
- D. 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 as close to neutral pressure as possible according to NFPA 252, UL 10B, and UL 10C.
 - 1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, 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.
 - 2. Blocking: When through-bolts are not to be used, indicate size and location of blocking in 45, 60 and 90 minute mineral cores.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.

1.6 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 temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

1.7 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.
 - c. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Eggers Industries.
 2. Graham Wood Doors; an Assa Abloy Group company.
 3. Masonite Architectural.

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:
 1. Extra Heavy Duty.
 2. Aesthetic Grade: Custom
- C. Particleboard-Core Doors:
 1. Particleboard: Straw-based particleboard complying with ANSI A208.1, Grade LD-2 or M-2, except for density.
 2. Provide doors with either glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- D. Structural-Composite-Lumber-Core Doors:
 1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf.
 - b. Screw Withdrawal, Edge: 400 lbf
- E. Fire-Protection-Rated Doors: Provide mineral core as needed to provide fire-protection rating indicated.
- 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 needed to eliminate through-bolting hardware.
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. Faces: Plain sliced, White Oak veneer, A face grade, slip matched.
2. Construction: Custom.
3. Door Thickness: 1-3/4-inch, unless noted otherwise.
4. Core Construction: Particleboard, AWI Type PC-5 (PC-7 not acceptable) ANSI A208.1, Grade 1-LD-2.
5. Core/Edge Interface: Bonded.
6. Edges:
 - a. Top and Bottom – Mill option hardwood (edge banded).
 - b. Vertical – Provide veneer wrapped edges over mill option hardwood stiles.
7. Face Panels: Manufacturer's standard 2 ply hot pressed panels with Type 1 glue.
8. Crossbands: 1/16-inch minimum hardwood veneer.
9. Matching: Pairs of doors shall be matched as pairs on both sides.
10. Core: Particleboard, Glued wood stave, and/or Structural composite lumber.
11. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering.

B. Fire-Rated Solid Core Doors:

1. Faces and AWI Grade: Provide faces and grade to match nonrated doors.
2. Core Construction: Manufacturer's best core construction as required to provide fire-resistance rating indicated.
3. Stile Construction: Manufacturer shall provide stiles that will provide the maximum screw withdrawal rate for use with full mortise hinges. Withdrawal rate shall be not less than 740 lbs. Stiles shall be manufacturer's standard, SLM (special laminated materials) or superstile. Stiles constructed with Maranite Interstile are not acceptable. Test results for screw withdrawal shall be submitted to the Architect.
4. Door Thickness: 1-3/4-inch.
5. Edges:
 - a. Top and Bottom - Mill option hardwood.
 - b. Vertical – Provide veneer wrapped edges over mill option hardware stiles.
6. Lock Blocks: Manufacturer shall provide lock blocks for mortise and bored locks, minimum 5-inches by 10-inches, or manufacturer's standard, 2 lock blocks for RIM, mortise and vertical rod exist devices. Provide 5-inch top rail for attachment of closers

and bottom rail (heights as required) for attachment of vertical rod exit device bottom latch and automatic flush bolts.

7. Pairs of wood doors with a 20, 30, 45, 60 and 90 min. rating with 3 point latching, lockset and flush bolts, shall be supplied with manufacturer's standard steel edges and steel astragal, factory applied and factory prepared for hardware as scheduled. (Astragal shall be mounted on key side of doors. Where active leaf is RH (right hand) or LH (left hand), the astragal shall be mounted on the inactive leaf and overlap the active leaf. Where the active leaf is RHR (right hand reverse) or LHR (left hand reverse), the astragal shall be mounted on the active leaf and overlap the inactive leaf. For beveling requirements, see Article 2.6 A.
8. Where pairs of labeled doors are used in a means of egress with 2 vertical rod exit devices, the door shall be provided with manufacturer's standard edges (metal or treated) as tested without the steel astragal.
9. Door supplier shall provide veneered bead glass stops for 60 and 90-minute doors with maximum 100 square inches of visible glass. 45 minute doors shall be provide with factory installed metal clips to allow for visible glass sizes up to 1080 square inches.

2.4 LIGHT FRAMES

- A. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Stop to be flush with face veneer; recessed stops not acceptable. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.
- B. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with the flush wood door manufacturer's written instructions.

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. 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 fire rated doors indicated to have light openings. Field install glazing in non-rated doors indicated to have light openings. Comply with applicable requirements in Division 08 Section "Glazing."
- D. Electrical Raceways: Provide flush wood doors receiving electrified hardware with concealed wiring harness and connectors on both ends to accommodate up to twelve wires. Coordinate connectors on the end of wiring harness to plug directly into the electrified hardware and the through wire transfer hardware or wiring harness specified in hardware sets (Div. 08 "Hardware"). Wires not connected are not acceptable.

2.6 PREFITTING AND PREPARATION FOR HARDWARE

- A. Prefit and premachine wood doors at factory, include beveling both edges 1/8-inch in 2-inches. Where pairs of doors are scheduled, prefit and premachine as pairs. Where pairs of doors are scheduled with 3-point latching, lockset and flush bolts, the strike edge of the inactive leaf shall be square.
- B. Comply with tolerances requirements of NFPA 80 and AWI for prefitting. Machine doors for hardware requiring cutting of doors. Comply with final hardware schedules, doorframe shop drawings, hardware templates, and other essential information required to ensure proper fit of doors and hardware.
 - 1. Top and hinge edges: 1/8-inch.
 - 2. Single door, lock edge: 1/8-inch.
 - 3. Pair meeting edge: 1/8-inch.
 - 4. Bottom (rated or non-rated):
 - a. 1/2-inch from decorative floor covering.
 - b. 3/4-inch maximum from top of noncombustible floor.
 - c. 3/8-inch maximum from top of noncombustible sill or threshold.
 - d. Doors with vertical rod exit devices or manual or automatic flush bolts shall be undercut for latching of bolts to a flush floor strike or threshold.

2.7 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.
- B. Finish doors at factory.
- C. Transparent Finish:
 - 1. Grade: Custom.

2. Finish: AWI catalyzed polyurethane 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 doorframes 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 Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated. 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. Fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
 - a. Comply with NFPA 80 for fire-rated doors.
 2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
 3. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- 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 081416

SECTION 081613 – FRP DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Provide FRP (fiberglass reinforced polyester) doors as scheduled.
- B. Hardware for FRP doors will be furnished under Division 08 - Door Hardware, except continuous gear hinges, but installed under this Section.
- C. Related Work Specified Elsewhere
 - 1. Section 087100 - Door Hardware.

1.3 SYSTEM PERFORMANCE

- A. Provide door assemblies that have been designed and fabricated to comply with requirements for system performance characteristics listed below, as demonstrated by testing manufacturers corresponding standard systems according to test methods designated
 - 1. Thermal Transmission (exterior doors): "U" value of not more than 0.09 (BTU/HR by sq.ft. by degrees F) per AAMA 1503.01.
 - 2. Flame Spread/Smoke Developed: Provide FRP doors and panels with the following ratings in accordance with ASTM E84-79a:
 - a. Exterior panel of exterior door
 - 1) Flame Spread: Not greater than 170 (Class C).
 - 2) Smoke Developed: Not greater than 390 (Class C).
 - b. Interior panels.
 - 1) Flame Spread: Not greater than 15 (Class A).
 - 2) Smoke Developed: Not greater than 310 (Class A).
 - 3. Abrasion Resistance: Face sheet to have no greater than .029 average weight loss percentage after Taber Abrasion Test - 25 cycles at 500 gram weight with H-18 wheel.
 - 4. Stain Resistance: Face sheet to be unaffected after 24 hour exposure to SVS-1 white spray enamel. Must retain 02 or .54 or less with MacBeth Coloimeter. Dark brown (bronze) FRP to be used as a basis.

5. Chemical Resistance: Face sheet to be unaffected after 4 hour exposure to acetic acid (10 percent solution), acetone, sodium hypochlorite (5.25 percent solution) and hydrochloric acid (10 percent solution). No discoloration or panel damage will be allowed.

1.4 SUBMITTALS

- A. Product Data: Submit door manufacturer's product data, specifications, and installation instructions for each type of door.
 1. Include details of core and edge construction, trim for openings and louvers (if any), and similar components.
 2. Include certifications as may be required to show compliance with specifications.
- B. Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, requirements for factory finishing, and other pertinent data.
- C. Submit samples in duplicate of the following materials to the Architect for approval. Approval must be obtained prior to fabrication for:
 1. Sections showing door construction.
 2. Two sets of samples showing complete, standard colors for Architect's selection.

1.5 QUALITY ASSURANCE

- A. Standards: Comply with the requirements and recommendations in applicable specification and standards by AAMA, except to the extent more stringent requirements are indicated.
- B. Doors shall be provided to conform with the American with Disabilities Act Accessibility Guidelines (ADAAG) and State and Local Regulations. These requirements supersede Technical Specifications in this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Doors shall be packaged individually and shipped in individual cartons. Doors shall be floated within the cartons, with no portion of the door or hardware to be in contact with the outer corrugated shell.

1.7 WARRANTY

- A. The manufacturer shall warrant, agree to replace at no cost to the Owner, doors which fail within the warranty period. Failure of materials includes excessive deflection and deterioration of finish or construction in excess of normal weathering.
- B. The time period of warranty is 10 years from Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. FRP Doors: Subject to compliance with requirements, provide products by one of the following:
1. Special-Lite, Inc.
 2. Cline Doors
 3. REBCO, Inc.
 4. Tiger Door, LLC.
 5. FRP Architectural Doors, Inc.

2.2 MATERIALS

A. Construction

1. Door Thickness: 1-3/4 inches.
2. Stiles and Rails: Aluminum Alloy 6063-T5, minimum of 2-5/16-inch depth.
3. Corners: Mitered.
4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom as standard tubular shaped stiles and rails reinforced to accept hardware as specified.
5. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, glue, or other methods are not acceptable.
6. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.
7. Rail caps or other face sheet capture methods are not acceptable.
8. Extrude top and bottom rail legs for interlocking continuous weather bar.
9. Meeting Stiles: Pile brush weatherseals. Extrude meeting stile to include integral pocket to accept pile brush weatherseals.
10. Bottom of Door: Install bottom weather bar with nylon brush weatherstripping into extruded interlocking edge of bottom rail.

B. Doors

1. Door Face Sheets (Standard FRP)
 - a. Standard face sheets shall be manufactured using a corrosion resistant resin system with light stabilizing additives. The resin shall be reinforced with fiberglass, 40% by weight.
 - b. Face sheet shall be 0.120 inch thick with finish color throughout. Abuse-resistant engineered surface.
2. Door Face Sheets (Non-combustible aluminum)
 - a. Interior and exterior 0.125'' thick smooth aluminum sheet.
 - b. Attachment of face sheet.

1. Extruded stiles and rails to have integral reglets to accept face sheet on both interior and exterior side of door which secure face sheet into place and permit flush appearance.
 2. Use of glue to bond face sheet to core or extrusions is not permitted.
3. Internal Construction
- a. Core
 - 1) Material: Poured-in-place polyurethane foam.
 - 2) Density: Minimum of 5 pounds per cubic foot.
 - 3) R-Value: Minimum of 9.
 - b. Aluminum Members:
 - 1) Extrusions: ASTM B 221.
 - 2) Sheet and Plate: ASTM B 209.
 - 3) Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.
 - c. Components: Door and frame components from same manufacturer.
 - d. Fasteners:
 - 1) Material: Aluminum, 18-8 stainless steel, or other noncorrosive metal.
 - 2) Compatibility: Compatible with items to be fastened.
 - 3) Exposed Fasteners: Screws with finish matching items to be fastened.
- C. Door Frames
1. Tubular Aluminum - Alloy 6063-T5, 1/8-inch minimum wall thickness. Frame size 2" x 6"-inch.
 2. Applied Door Stops: 0.625-inch high, with screws and weatherstripping. Door stop shall incorporate pressure gasketing for weathering seal. Counterpunch fastener holes in door stop to preserve full metal thickness under fastener head.
 3. Frame Members: Box type with 4 enclosed sides. Open-back framing is not acceptable.
 4. Caulking: Caulk joints before assembling frame members.
 5. Joints:
 - a. Secure joints with fasteners.
 - b. Provide hairline butt joint appearance.
 6. Applied Stops: For side, transom, and borrowed lites and panels. Applied stops shall incorporate pressure gasketing for weathering seal. Reinforce with solid bar stock fill for frame hardware attachments.
 7. Hardware:
 - a. Premachine and reinforce frame members for hardware in accordance with manufacturer's standards and hardware schedule.
 - b. Factory install hardware.

8. Anchors:
 - a. Anchors appropriate for wall conditions to anchor framing to wall materials.
 - b. Door Jamb and Header Mounting Holes: Maximum of 24-inch centers.
 - c. Secure head and sill members of transom, side lites, and similar conditions.

D. Hardware

1. For hardware furnished by others, refer to Division 08 “Door Hardware”.
2. Meeting stiles on pairs of doors and top and bottom rigidity weather bars shall have Schlegel type pile weatherstripping. The meeting stiles weatherstripping shall be placed in an adjustable astragal. No additional weatherstripping is required. No vinyl, plastic, or other type weatherstripping is acceptable.
3. FRP doors shall be premachined in accordance with templates from the specified hardware manufacturers and approved hardware schedule. Surface applied hardware shall utilize the Riv-Nut or similar blind fastener for attachment. FRP doors shall be reinforced for specified hardware in accordance with the manufacturer's standards. Hardware, excepting the door closer, threshold, or other field applied hardware as noted, shall be installed on the door assembly at the factory and shipped applied to the door assembly at the job site. Glass and glazing, louvers, or panels for the door assembly shall be factory supplied and installed and shipped installed to the job site.

2.3 FINISH

A. Aluminum

1. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 - a. Color: As selected by Architect from full range of industry colors and color densities.

B. FRP

1. Manufacturer’s custom colored pigmented sealer. The sealer shall be as durable and stain resistant as the FRP face sheet.
 - a. Color: As specified by the Architect from standard manufacturers colors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Inspection

1. Installer shall examine aluminum doorframes and verify that frames are correct for proper hanging of corresponding doors. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

3.3 INSTALLATION

- A. Comply with manufacturer's recommendations and specifications for the installation of the doors and frames.
- B. Set units plumb, level and true in line, without warp or rack of doors or frames. Anchor securely in place. Separate aluminum and other metal surfaces with bituminous coatings or other means as approved by the Architect.
- C. Anchor frames securely in place.
- D. Separate aluminum from other metal surfaces with bituminous coatings.
- E. Set thresholds in bed of mastic and backseal.
- F. Install exterior doors to be weathertight in closed position.
- G. Stuff fiberglass insulation to fill any voids along aluminum frames on all exterior doors.
- H. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- I. Remove and replace damaged components as determined by Architect.

3.4 ADJUSTING

- A. Adjust doors, hinges, and locksets for smooth operation without binding.

3.5 CLEANING

- A. Clean surface promptly after installation of doors and frames, exercising care to avoid damage to the protective coatings in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage finish.

3.6 PROTECTION

- A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

- B. Ensure that the doors and frames will be without damage or deterioration (other than normal weathering) at the time of acceptance.
- C. Provide Owner with all adjustment tools and instructions sheets. Arrange an inservice session to Owner at Owner's convenience.

END OF SECTION 081613

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SECTION 083113 - ACCESS 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. This Section includes access doors and frames for ceilings and walls.
- B. Related Sections include the following:
 - 1. Division 09 Section "Gypsum Board" for gypsum wall board.

1.3 SUBMITTALS

- A. Product Data: For each type of access door and frame indicated. Include construction details, fire ratings, materials, individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.
- C. Product Schedule: Provide access door and frame schedule, including types, locations, sizes, latching or locking provisions and other pertinent data for installation.

1.4 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND FRAMES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Basis of Design: Acudor Products, Inc. Model DW-5058 (See Drawings for Size)
 - 2. Babcock-Davis.
 - 3. J. L. Industries, Inc.
 - 4. Karp Associates, Inc.

5. Milcor Inc.
6. Nystrom, Inc.
7. Williams Bros. Corporation of America (The).

B. Recessed Access Doors:

1. Assembly Description: Fabricate door in the form of a pan recessed 5/8 inch for gypsum board infill. Provide frame with gypsum board bead for concealed flange installation.
2. Locations: Ceiling and Walls.
3. Door Size: 12" x 12" minimum, size as required to provide adequate access.
4. Uncoated Steel Sheet for Door: Nominal 0.075 inch.
 - a. Finish: Factory prime.
5. Frame Material: Minimum 16 ga. sheet steel with flange suitable for adjacent material.
6. Hinges: Manufacturer's standard.
7. Hardware: Latch.

C. Hardware:

1. Latch: Cam latch operated by hex-head wrench.

2.2 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Frame Anchors: Same type as door face.
- D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
 1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
 2. Provide mounting holes in frames for attachment of units to metal or wood framing.

3. Provide mounting holes in frame for attachment of masonry anchors.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.
- E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
 1. For recessed panel doors, provide access sleeves for each latching device. Furnish plastic grommets and install in holes cut through finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

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SECTION 083613 - SECTIONAL DOORS

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 electrically operated sectional doors.
- B. Related Sections:
 - 1. Division 26 Sections for electrical service and connections for powered operators and accessories.

1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Sectional doors shall meet performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.
- B. Structural Performance: Exterior sectional doors shall withstand the effects of gravity loads, and the following loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Wind Loads: Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.
 - a. Basic Wind Speed: 90 mph.
 - b. Importance Factor: 1.15.
 - c. Exposure Category: C.
 - 2. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components. Deflection of door in horizontal position (open) shall not exceed 1/120 of the door width.
- C. Windborne-Debris-Impact-Resistance Performance: Provide impact-protective overhead coiling doors capable of resisting impact from windborne debris, based on the pass/fail criteria when tested according to ASTM E 1886 and ASTM E 1996 and requirements of authorities having jurisdiction.
- D. Operation Cycles: Provide sectional door components and operators capable of operating for not less than number of cycles indicated for each door. One operation cycle is complete when a

door is opened from the closed position to the fully open position and returned to the closed position.

1.4 SUBMITTALS

- A. Product Data: For each type and size of sectional door and accessory. Include the following:
 - 1. Construction details, material descriptions, dimensions of individual components, profile door sections, and finishes.
 - 2. Rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Wiring Diagrams: For power, signal, and control wiring.
- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
 - 1. Include similar Samples of accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Flat Door Sections: 6 inches square.
- E. Qualification Data: For qualified Installer.
- F. Maintenance Data: For sectional doors to include in maintenance manuals.
- G. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain sectional doors from single source from single manufacturer.
 - 1. Obtain operators and controls from sectional door manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- D. Standard for Sectional Doors: Fabricate sectional doors to comply with DASMA 102 unless otherwise indicated.
- E. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Faulty operation of hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.
 - d. Delamination of exterior or interior facing materials.
 - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 STEEL DOOR SECTIONS

- A. Exterior Section Faces and Frames: Fabricate from zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated zinc coating and thickness.
 - 1. Fabricate section faces from single sheets to provide sections not more than 24 inches high and of indicated thickness. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weathertight seal, with a reinforcing flange return.
 - 2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.
- B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inch nominal coated thickness and welded to door section. Provide intermediate stiles formed from not less than 0.064-inch thick

galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches apart.

- C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile.
- D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.
- E. Provide reinforcement for hardware attachment.
- F. Foamed-in-Place Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free polyurethane insulation, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load, and with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within steel sections that incorporate the following interior facing material, with no exposed insulation:
 - 1. Interior Facing Material: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated thickness.
- G. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints and free of warp, twist, and deformation.

2.2 TRACKS, SUPPORTS, AND ACCESSORIES

- A. Tracks: Manufacturer's standard, galvanized-steel track system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances shown on Drawings, and complying with ASTM A 653/A 653M for minimum G60 zinc coating. Provide complete track assembly including brackets, bracing, and reinforcement for rigid support of ball-bearing roller guides for required door type and size. Slot vertical sections of track spaced 2 inches apart for door-drop safety device. Slope tracks at proper angle from vertical or design tracks to ensure tight closure at jambs when door unit is closed.
- B. Track Reinforcement and Supports: Galvanized-steel track reinforcement and support members, complying with ASTM A 36/A 36M and ASTM A 123/A 123M. Secure, reinforce, and support tracks as required for door size and weight to provide strength and rigidity without sag, sway, and vibration during opening and closing of doors.
 - 1. Vertical Track Assembly: Track with continuous reinforcing angle attached to track and attached to wall with jamb brackets or wall jamb brackets attached to track and attached to wall.
 - 2. Horizontal Track Assembly: Track with continuous reinforcing angle attached to track and supported at points from curve in track to end of track by laterally braced attachments to overhead structural members.
- C. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated.

- D. Windows: Manufacturer's standard window units of type and size indicated and in arrangement shown. Set glazing in vinyl, rubber, or neoprene glazing channel for metal-framed doors and elastic glazing compound for wood doors, as required. Provide removable stops of same material as door-section frames.

2.3 HARDWARE

- A. General: Provide heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.
- B. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch nominal coated thickness at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is not possible. Provide double-end hinges where required, for doors over 16 feet wide unless otherwise recommended by door manufacturer.
- C. Rollers: Heavy-duty rollers with steel ball bearings in casehardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 3-inch diameter roller tires for 3-inch wide track and 2-inch diameter roller tires for 2-inch wide track.
- D. Push/Pull Handles: For push-up or emergency-operated doors, provide galvanized-steel lifting handles on each side of door.

2.4 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded deadbolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
 - 1. Lock Cylinders: Provide cylinders specified in Division 08 Section "Door Hardware" and keyed to building keying system.
 - 2. Keys: Three for each cylinder.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.5 COUNTERBALANCE MECHANISM

- A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from steel-spring wire complying with ASTM A 229/A 229M, mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for number of operation cycles indicated.
- B. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft. Provide one additional midpoint bracket for shafts up to 16 feet long and two

additional brackets at one-third points to support shafts more than 16 feet long unless closer spacing is recommended by door manufacturer.

- C. Cables: Galvanized-steel lifting cables with cable safety factor of at least 7 to 1.
- D. Cable Safety Device: Include a spring-loaded steel or spring-loaded bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either lifting cable breaks.
- E. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
- F. Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

2.6 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.
 - 1. Jackshaft, Side Mounted: Jackshaft operator mounted on the inside front wall on right or left side of door and connected to torsion shaft with an adjustable coupling or drive chain.
- D. Electric Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Division 11 Section "Common Motor Requirements for Equipment" unless otherwise indicated.
 - 1. Electrical Characteristics:
 - a. Phase: Single phase.
 - b. Volts: 115 V.
 - c. Hertz: 60.
 - 2. Motor Type and Controller: Reversible motor and controller (disconnect switch) for motor exposure indicated.
 - 3. Motor Size: Minimum size. Large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.

4. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 5. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
 6. Use adjustable motor-mounting bases for belt-driven operators.
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- F. Obstruction Detection Device: Equip motorized door with indicated external automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
- G. Remote-Control Station: Momentary-contact, three-button control station with push-button controls labeled "Open," "Close," and "Stop."
1. Exterior units, full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 35 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.
- K. Radio-Control System: Consisting of the following:
1. Three-channel universal coaxial receiver to open, close, and stop door; two per operator.
 2. Remote antenna and mounting kit.

2.7 DOOR ASSEMBLY

- A. Steel Sectional Door: Sectional door formed with hinged sections.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Clopay Building Products; a Griffon company.
 - b. Overhead Door Corporation.
 - c. Wayne-Dalton Corp.

- B. Operation Cycles: Not less than 20,000.
- C. Steel Sections: Zinc-coated (galvanized) steel sheet with G60 zinc coating.
 - 1. Section Thickness: 2 inches.
 - 2. Exterior-Face, Steel Sheet Thickness: 0.034-inch nominal coated thickness.
 - a. Surface: Manufacturer's standard, stucco embossed.
 - 3. Insulation: Foamed in place.
 - 4. Interior Facing Material: Zinc-coated (galvanized) steel sheet of 0.016-inch nominal coated thickness.
- D. Track Configuration: Standard-lift track.
- E. Weatherseals: Fitted to bottom and top and around entire perimeter of door.
- F. Windows: Approximately 24 by 11 inches, with curved corners, and spaced apart the approximate distance as indicated on Drawings; in one row at approximate height indicated on Drawings; installed with insulated glazing of the following type:
 - 1. Insulating Glass: Manufacturer's standard utilizing tempered safety glass.
- G. Locking Devices: Equip door with locking device assembly.
 - 1. Locking Device Assembly: Cremone type, both jamb sides, locking bars, operable from inside and outside, with cylinders.
- H. Counterbalance Type: Torsion spring.
- I. Electric Door Operator:
 - 1. Usage Classification: Medium duty, up to 15 cycles per hour.
 - 2. Operator Type: Jackshaft, side mounted.
 - 3. Motor Exposure: Interior, clean, and dry.
 - 4. Emergency Manual Operation: Push-up type.
 - 5. Obstruction-Detection Device: Automatic photoelectric sensor.
 - 6. Remote-Control Station: Exterior.
 - 7. Other Equipment: Radio-control system.
- J. Door Finish:
 - 1. Baked-Enamel or Powder-Coated Finish: Color and gloss as selected by Architect from manufacturer's full range.
 - 2. Finish of Interior Facing Material: Finish as selected by Architect from manufacturer's full range.

2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Tracks:
 - 1. Fasten vertical track assembly to opening jambs and framing, spaced not more than 24 inches apart.
 - 2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
 - 3. Repair galvanized coating on tracks according to ASTM A 780.
- C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

3.3 STARTUP SERVICES

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust doors and seals to provide weathertight fit around entire perimeter.
- D. Align and adjust motors, pulleys, belts, sprockets, chains, and controls according to manufacturer's written instructions.
- E. Touch-up Painting: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A 780.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION 083613

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

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. Exterior storefront framing.
2. Exterior manual-swing entrance doors.
3. Casement/Picture Windows
4. Flashing.

- B. Related Sections:

1. Division 08 Section "Glazing" for glazing used in storefront framing
2. Division 08 Section "Door Hardware" for doors used in storefronts.

1.3 DEFINITIONS

- A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.4 PERFORMANCE REQUIREMENTS

- A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
 1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
 2. Dimensional tolerances of building frame and other adjacent construction.
 3. Failure includes the following:
 - a. Deflection exceeding specified limits.
 - b. Thermal stresses transferring to building structure.
 - c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
 - d. Noise or vibration created by wind and by thermal and structural movements.

- e. Loosening or weakening of fasteners, attachments, and other components.
 - f. Failure of operating units.
- B. Structural Loads:
- 1. Wind Loads: As indicated on Structural Drawings.
 - 2. Seismic Loads: As indicated on Structural Drawings.
- C. Deflection of Framing Members:
- 1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed $L/175$ of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to $3/4$ inch, whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to $L/360$ of clear span or $1/8$ inch, whichever is smaller.
- D. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:
- 1. When tested at positive and negative wind load design pressures, assemblies do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 - 3. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.
- E. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).
- F. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. Water leakage is defined as follows:
- 1. Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that are drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.
 - 2. Gasket Failures: Water leakage through fixed glazing and framing areas.
- G. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.
- H. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.45 Btu/sq. ft. x h x deg. (R2.2min.).

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components, profiles and finishes.
- B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
 - 2. Provide 3-D isometric shop drawings from product manufacturer for Aluminum-Framed systems as indicated.
- C. Samples: For each type of exposed finish required.
- D. Other Action Submittals:
 - 1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.
 - 1. Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in Ohio.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field-testing, and in-service performance.
 - 1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.
- D. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.
- E. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and as concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of entrance and storefront systems that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to , the following:
 - 1. Structural failures including, but not limited to, excessive deflection.
 - 2. Gasket failures.
 - 3. Failure of system to meet performance requirements.
 - 4. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 5. Failure of operating components to function normally.
 - 6. Water leakage through fixed glazing and frame areas.
 - 7. Water leakage through or under furnished thresholds.
- C. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Basis of Design: Kawneer North America.
 - 2. EFCO Corporation.
 - 3. Tubelite.
 - 4. Oldcastle.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Sheet and Plate: ASTM B 209.
 - 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 - 4. Structural Profiles: ASTM B 308/B 308M.

5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING MATERIALS AND CONSTRUCTION

A. Type I – 4.5-inch Trifab VG 451T (2'x 4.5' frame/thermal break): Framing members shall provide for center glazing of 1"-inch insulating glass, by use of elastomeric gaskets on both sides of the glass, with no projecting stops. Vertical and horizontal members shall have a nominal face dimension of 2-inches with an overall depth of 4.5inches.

1. Application

- a. Exterior casement/picture windows.
- b. Exterior door frames, sidelight frames and transom frames where exit vestibules are present.
- c. Exterior door frames, sidelight frames and transom frames where vestibules are not present.

2.4 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Type I – Thermally Broken.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: Center.

B. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

2. Reinforce members as required to receive fastener threads.
 3. Use exposed fasteners with countersunk Phillips screw heads finished to match framing system, fabricated from stainless steel.
- E. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.
- F. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- G. Subsill Base Flashing: Match gage, thickness and color of wall panel.
1. Subsills by aluminum storefront manufacturer.

2.5 GLAZING SYSTEMS

- A. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
 - a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 100 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
 - a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Glazing: As specified in Division 08 Section "Glazing."
- C. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.
- D. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

2.6 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Glazed entrance doors for manual-swing operation.
1. Door Construction: 1-3/4" overall thickness, with minimum 0.188-inch thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing

brackets that are deeply penetrated, and fillet welded or that incorporate concealed tie rods.

2. Door Design: Kawneer 350 Medium Stile Entrance.
 - a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches above floor or ground plane.
 3. Glazing Stops and Gaskets: Square glass stops for ¼” infill and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
- B. Entrance Door Hardware: Provide CO-9 Pull and Bottom Door Sweep.
 - a. Refer to Division 08 Section "Door Hardware" for additional Hardware.

2.7 ACCESSORY MATERIALS

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."
1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Trim and Clip: Install on exterior aluminum windows.
 1. Provide Kawneer #52 Trim (S-2078) and #52 Clip (S-2079) as indicated on Drawings.
- C. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.

2.8 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fitted joints with ends coped or mitered.
 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 4. Physical and thermal isolation of glazing from framing members.
 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 6. Provisions for field replacement of glazing from interior.

7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
 1. At exterior doors, provide compression weather stripping at fixed stops.
 2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.
- F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 2. At exterior doors, provide weather sweeps applied to door bottoms.
- G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.9 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 1. Color: To be selected by Architect from standard range of colors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General:
 1. Comply with manufacturer's written instructions.
 2. Do not install damaged components.
 3. Fit joints to produce hairline joints free of burrs and distortion.

4. Rigidly secure nonmovement joints.
 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
 6. Seal joints watertight unless otherwise indicated.
 7. Do not penetrate flashing or air barrier.
 8. Sub sills to be installed with end dams and with positive drainage.
- B. Metal Protection:
1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.
- E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.
- F. Install glazing as specified in Division 08 Section "Glazing."
- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- H. Stuff all voids along aluminum frames with fiberglass insulation at exterior doors.
- I. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.
- J. Coordinate with Division 08, Division 26, and security access contractor for location and installation of conduit/wiring required for electrified hardware items mounted to doors and frames, including, but not limited to cutting/drilling any access holes required for pulling wires through frame head/jamb to the electrified hardware items.
- 3.3 ADJUSTING
- A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.

END OF SECTION 084113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY:

- A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.
1. Door hardware for steel (hollow metal) doors.
 2. Door hardware for aluminum doors.
 3. Door hardware for wood doors.
 4. Door hardware for other doors indicated.
 5. Keyed cylinders as indicated.
- B. Related Sections:
1. Division 6: Rough Carpentry.
 2. Division 8: Aluminum Doors and Frames
 3. Division 8: Hollow Metal Doors and Frames.
 4. Division 8: Wood Doors.
 5. Division 26 Electrical
 6. Division 28: Electronic Security
- C. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.
1. Builders Hardware Manufacturing Association (BHMA)
 2. NFPA 101 Life Safety Code
 3. NFPA 80 -Fire Doors and Windows
 4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
 5. UL10C – Positive Pressure Fire Test of Door Assemblies
 6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities
 7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware
 8. ICC – International Building Code
- D. Intent of Hardware Groups
1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
 2. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to be submitted to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.
- E. Allowances
1. Refer to Division 1 for allowance amount and procedures.
- F. Alternates

1. Refer to Division 1 for Alternates and procedures.
- 1.2 SUBSTITUTIONS:
- A. Comply with Division 1.
- 1.3 SUBMITTALS:
- A. Comply with Division 1.
 - B. Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.
 - C. Product Data: Manufacturer's specifications and technical data including the following:
 1. Detailed specification of construction and fabrication.
 2. Manufacturer's installation instructions.
 3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
 4. Submit 6 copies of catalog cuts with hardware schedule.
 5. Provide 9001-Quality Management and 14001-Environmental Management for products listed in Materials Section 2.2
 - D. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.
 1. List groups and suffixes in proper sequence.
 2. Completely describe door and list architectural door number.
 3. Manufacturer, product name, and catalog number.
 4. Function, type, and style.
 5. Size and finish of each item.
 6. Mounting heights.
 7. Explanation of abbreviations and symbols used within schedule.
 8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.
 - E. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
 1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.
 - F. Samples: (If requested by the Architect)
 1. 1 sample of Lever and Rose/Escutcheon design, (pair).
 2. 3 samples of metal finishes
 - G. Contract Closeout Submittals: Comply with Division 1 including specific requirements indicated.

1. Operating and maintenance manuals: Submit 3 sets containing the following.
 - a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Name, address, and phone number of local representative for each manufacturer.
 - d. Parts list for each product.
2. Copy of final hardware schedule, edited to reflect, "As installed".
3. Copy of final keying schedule
4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.4 QUALITY ASSURANCE

A. Comply with Division 1.

1. Statement of qualification for distributor and installers.
2. Statement of compliance with regulatory requirements and single source responsibility.
3. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.
 - a. Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
 - b. Hardware Schedule shall be prepared and signed by an AHC.
4. Installer's Qualifications: Firm with 3 years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
5. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
 - a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
 - b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
6. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

- ##### B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Comply with Division 1.

1. Deliver products in original unopened packaging with legible manufacturer's identification.

2. Package hardware to prevent damage during transit and storage.
3. Mark hardware to correspond with "reviewed hardware schedule".
4. Deliver hardware to door and frame manufacturer upon request.

B. Storage and Protection: Comply with manufacturer's recommendations.

1.6 PROJECT CONDITIONS:

A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.

B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.7 WARRANTY:

A. Refer to Conditions of the Contract

B. Manufacturer's Warranty:

1. Closers: Thirty years
2. Exit Devices: Five Years
3. Locksets & Cylinders: Three years
4. All other Hardware: Two years.

1.8 OWNER'S INSTRUCTION:

A. Instruct Owner's personnel in operation and maintenance of hardware units.

1.9 MAINTENANCE:

A. Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.

1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
3. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra service materials.

B. Maintenance Service: Submit for Owner's consideration maintenance service agreement for electronic products installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

| <u>Item:</u> | <u>Manufacturer:</u> | <u>Approved:</u> |
|---------------------|----------------------|------------------------------|
| Hinges | Stanley | Hager, Ives, McKinney |
| Continuous Hinges | Stanley | Hager, National Guard, Pemko |
| Locksets | Best | Sargent, Schlage |
| Cylinders | Best | Sargent, Schlage |
| Exit Devices | Precision | Sargent, Von Duprin |
| Closers | Best HD8000 | LCN 4040XP, Sargent 351 |
| Automatic Operators | Dorma | LCN, Norton |
| Push/Pull Bars | Trimco | Burns, Rockwood |
| Protection Plates | Trimco | Burns, Rockwood |
| Door Stops | Trimco | Burns, Rockwood |

2.2 MATERIALS:

- A. Hinges: Shall be Five Knuckle Ball bearing hinges
1. Template screw hole locations
 2. Bearings are to be fully hardened.
 3. Bearing shell is to be consistent shape with barrel.
 4. Minimum of 2 permanently lubricated non-detachable bearings on standard weight hinge and 4 permanently lubricated bearing on heavy weight hinges.
 5. Equip with easily seated, non-rising pins.
 6. Non Removable Pin screws shall be slotted stainless steel screws.
 7. Hinges shall be full polished, front, back and barrel.
 8. Hinge pin is to be fully plated.
 9. Bearing assembly is to be installed after plating.
 10. Sufficient size to allow 180-degree swing of door
 11. Furnish five knuckles with flush ball bearings
 12. Provide hinge type as listed in schedule.
 13. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
 14. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
 15. UL10C listed for Fire rated doors.
- B. Geared Continuous Hinges:
1. Tested and approved by BHMA for ANSI A156.26-1996 Grade 1
 2. Anti-spinning through fastener
 3. UL10C listed for 3 hour Fire rating
 4. Non-handed
 5. Lifetime warranty
 6. Provide Fire Pins for 3-hour fire ratings

7. Sufficient size to permit door to swing 180 degrees
- C. Electrified Functions for Hinges: Comply with the following:
1. Power Transfer: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle. Provide wire quantity and sizes required for electric hardware be served.
 2. Monitoring: Concealed electrical monitoring switch.
 3. Power Transfer and Monitoring: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle, and with concealed electrical monitoring switch.
- D. Mortise Type Locks and Latches:
1. Tested and approved by BHMA for ANSI A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and be UL10C.
 2. Furnish UL or recognized independent laboratory certified mechanical operational testing to 4 million cycles minimum.
 3. Provide 9001-Quality Management and 14001-Environmental Management.
 4. Fit ANSI A115.1 door preparation
 5. Functions and design as indicated in the hardware groups
 6. Solid, one-piece, 3/4-inch (19mm) throw, anti-friction latchbolt made of self-lubricating stainless steel
 7. Deadbolt functions shall have 1 inch (25mm) throw bolt made of hardened stainless steel
 8. Latchbolt and Deadbolt are to extend into the case a minimum of 3/8 inch (9.5mm) when fully extended
 9. Auxiliary deadlatch to be made of one piece stainless steel, permanently lubricated
 10. Provide sufficient curved strike lip to protect door trim
 11. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers that contain a hollow cavity are not acceptable
 12. Lock shall have self-aligning, thru-bolted trim
 13. Levers to operate a roller bearing spindle hub mechanism
 14. Mortise cylinders of lock shall have a concealed internal setscrew for securing the cylinder to the lockset. The internal setscrew will be accessible only by removing the core, with the control key, from the cylinder body.
 15. Spindle to be designed to prevent forced entry from attacking of lever
 16. Provide locksets with 7-pin removable and interchangeable core cylinders
 17. Each lever to have independent spring mechanism controlling it
 18. Core face must be the same finish as the lockset.
- E. Cylindrical Type Locks and Latchsets:
1. Provide locksets tested and approved by BHMA/ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty.
 2. Provide locksets listed by Underwriters Laboratories for use on fire rated single or double swinging doors.
 3. Provide locksets that meet the design and operation of the cylindrical lock to meet the accessible requirements of ANSI A117.1 and ADA–Americans with Disabilities Act.
 4. Provide locksets made in a manufacturing facility to compliant with ISO 9001-Quality Management and ISO 14001-Environmental Management.
 5. Provide locksets that meet or exceed 20 Million cycle test verified by third party testing agency.
 6. Provide locksets with the following mechanical features

- a. Locksets outside locked lever must withstand minimum 1400 inch-pounds of torque. In excess of that, a replaceable part will shear. Key from outside and/or inside lever will still operate lockset.
 - b. Locksets shall fit modified ANSI A115.2 door preparation.
 - c. 2-3/4 inch (70 mm) backset, standard.
 - d. Door thickness – Available for 1 3/8” to 2 1/4” doors.
 - e. 9/16 inch (14 mm) throw latchbolt.
 - f. Latch to have single piece tail-piece construction.
 - g. Chassis – Critical latch and chassis components to be brass or corrosion-treated steel.
 - h. Lock shall allow the lever handle to move 45 degrees from parallel to the horizontal plane without engaging the latchbolt assembly.
 - i. Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
 - j. Locksets to have anti-rotational studs that are thru-bolted.
 - k. Provide sufficient curved strike lip to protect door trim at single doors. At pairs of doors, provide 7/8” Lip to Center Strike.
 - l. Each lever to have independent spring mechanism.
 - m. Lever springs to be contained in the main lock hub.
 - n. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy.
 - o. Keyed lever to be removable only after core is removed, by authorized control key.
7. Locksets to have the capability of supporting manufacturers’ conventional core as well as large and small interchangeable cores.
 8. Provide core face with the same finish as the lockset.
 9. Provide functions and design as indicated in the hardware groups.

F. Exit Devices:

1. Exit devices to meet or exceed BHMA for ANSI 156.3, Grade 1.
2. Exit devices to be tested and certified by UL or by a recognized independent laboratory for mechanical operational testing to 10 million cycles minimum with inspection confirming Grade 1 Loaded Forces have been maintained.
3. Exit devices chassis to be investment cast steel, zinc dichromate.
4. Exit devices to have stainless steel deadlocking 3/4” through latch bolt.
5. Exit devices to be equipped with sound dampening on touchbar.
6. Non-fire rated exit devices to have cylinder dogging.
7. Non-fire rated exit devices to have 1/4” minimum turn hex key dogging.
8. Touchpad to be “T” style constructed of architectural metal with matching metal end caps.
9. Touchbar assembly on wide style exit devices to have a 1/4” clearance to allow for vision frames.
10. All exposed exit device components to be of architectural metals and “true” architectural finishes.
11. Provide strikes as required by application.
12. Fire exit hardware to conform to UL10C and UBC 7-2. UL tested for Accident Hazard.
13. The strike is to be black powder coated finish.
14. Exit devices to have field reversible handing.
15. Provide heavy duty vandal resistant lever trim with heavy duty investment cast stainless steel components and extra strength shock absorbing overload springs. Lever shall not require resetting. Lever design to match locksets and latchsets.

16. Provide 9001-Quality Management and 14001-Environmental Management.
17. Vertical Latch Assemblies to have gravity operation, no springs.
18. Exit Device Intruder Function Visual Indicator is to be used in conjunction with the ANSI “10” Function, which allows the outside lever trim to be locked from the inside while the door remains closed. Rim cylinder on the exterior/trim side retracts the latch from the outside.
 - a. Indicator to be actuated by a rim cylinder equipped with a keyed core or thumb-turn.
 - b. Directional indicator feature shall have a large status indicator window with directional pointer embossed into the active case cover to indicate key turn direction to lock and unlock outside lever trim. Labels or stickers are not acceptable.
 - c. The status indicator window shall be integrated into the housing of the exit device and is to contain bright reflective material that may be seen in low light conditions.
 - d. Indicator window to be protected by impact resistant lens cover.
 - e. The action to lock down/unlock shall require a quarter turn (90°) of key or thumb turn.
 - 1) Locked status shall be indicated by a red indicator that will appear under the lens cover with an image of a locked padlock.
 - 2) Unlocked status shall be indicated by a green indicator that will appear under the lens of the cover with an image of an unlocked padlock.

G. Cylinders:

1. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
2. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
3. Coordinate and provide as required for related sections.

H. Surface Door Closers

1. Rack and Pinion Aluminum Surface Closers (Heavy Duty – HD8000)
 - a. Provide Full Rack and Pinion type closer constructed of R14 High Silicon Aluminum Alloy, or equal, to exceed the ANSI/BHMA A156.4 Grade 1 requirements.
 - b. Provide closers tested and approved for UL10C for positive pressure; UL228 & CAN/ULC-S133.
 - c. Provide closers that conform to ANSI/ICC A117.1 and ADA requirements for barrier-free accessibility.
 - d. Closer shall be available with heavy-duty arms and knuckles/elbows
 - e. Closer shall have maximum 2 7/16 inch case projection with non-ferrous cover.
 - 1) Closer cover to be:
 - a) Plastic
 - 2) Closer cover finish to be:
 - a) Painted
 - f. Provide closers with all-weather hydraulic fluid.
 - g. Provide closers with separate adjusting valves for closing and latching speeds, as well as advanced backcheck and delayed action.
 - h. Provide closers with Delayed Action and/or Advanced Backcheck where noted in hardware sets.
 - i. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions.

- j. Mount closers on non-public side of door and stair side of stair doors, unless otherwise noted in hardware sets.
- k. Closers shall be non-handed and multi-sized as noted in hardware sets. When specific sized closers are required provide:
 - 1) Size 1 through 6 to meet barrier- free ADA requirements.

I. Low Energy Operators shall:

- 1. Conform to ANSI/BHMA A156.19 as a low energy power opening device.
- 2. Be listed under UL228, UL325, UL10B, UL10C, UBC 7.2 and FCC listed.
- 3. Shall be non-handed.
- 4. Be rated for door panels weighing up to 350 lbs (160 kg).
- 5. The manual door closer within the Low Energy Operator shall be adjusted to meet Americans with Disabilities Act (ADA) 5 lbs opening force [Push-Side applications only]
- 6. Operator shall be isolated from mounting plate with rubber mounts to mitigate the transmission of forces between the door and the operator.
- 7. Shall have a position encoder to communicate with microprocessor.
- 8. Incorporate a resettable powered operation counter that tracks both powered and non-powered cycling of the Operator.
- 9. Incorporate the following adjustable settings:
 - i. Hold Open Timer, to 28 seconds
 - ii. Open Speed
 - iii. Backcheck Speed
 - iv. Vestibule Sequence Timer
- 10. Include DIP switch controls for:
 - i. On board diagnostics
 - ii. Power close
 - iii. Push and Go operation
 - iv. Time delay logic for electrified hardware components
- 11. Include terminals for auxiliary controls including:
 - i. Activation devices; provide two discrete inputs
 - ii. Vestibule sequencing
- 12. Control switches including:
 - i. Day/Night open (illuminated)
 - ii. Power On-Off
- 13. Includes adhesive Low Energy Operator mounting templates.
- 14. R-14 Aluminum Allow Materials
- 15. For non-powered operation, the unit shall function as a standard door closer with adjustable spring force size 1 thru 6.

J. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.

- 1. Wall stop and floor stop shall be wrought bronze, brass or stainless steel.
- 2. Provide fastener suitable for wall construction.
- 3. Coordinate reinforcement of walls where wall stop is specified.
- 4. Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered

K. Push Pull Bars: Provide ANSI J504, .1” Dia. Pull and push bar model and series as listed in hardware set. Provide proper fasteners for door construction.

- L. Kickplates: Provide with four beveled edges ANSI J102, 10 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- M. Mop plates: Provide with four beveled edges ANSI J103, 4 inches high by width less 1 inch on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- N. Quick Connect Power Transfer: Power transfer device shall be a steel housing and flexible tube. Secure and inconspicuous channel is to bring power from the frame to the door.
 - 1. Precision EPT-12C
 - 2. Tube shall contain 12 Wire bundle with Stanley Quick Connect Connectors one 4 wire connector consisting of two 18AWG wires and 2 24AWG wires and one 8 wire connector with 8 24AWG wires.
- O. Power Supply: UL Listed, Field Selectable 12VDC or 24VDC output. The power supply will specifically designed to support electric locks and access controls. The power supply uses 115 VAC at 800mA input. The power shall be able to be expanded to four station controls. The filtered and regulated output power is field selectable for 12 or 24 VDC.
 - 1. Fire Alarm/Life Safety emergency release included in power supply.
 - 2. Available options for multiple door options four or more control stations, Adjustable Time delay relay, Battery charging, Battery Back up.
- P. Door Position Switch: Provide door position switch for door status monitoring as indicated in hardware sets.
 - 1. At all fired rated doors the door and frames, position switch preparation will be provided by the door and frame manufacturer or by an authorized label service agent.
- Q. Quick Connect plug-in connectors: Stanley quick connect plug-in must be used with a combination of the following components to work as a complete plug and play system.
 - 1. Best locks series 45HW, 45HM, 8KW, 9KW, 9KM
 - 2. To include Quick connectors to Best lock products Suffix “C” Example (45HW-7DEL14H DS C)
 - 3. Precision Exit Devices 2000 Series, DE, DS, TS, TDS, LDS, ELR
 - 4. To include Quick connectors to Precision Electric Exit device products Prefix “C” Example (C ELR 2108 x V4908A TS)
 - 5. Precision 12 Conductor Electric Power Transfer EPT-12C
 - 6. Stanley 12 Hinges Conductor Hinge CECB179-12C
- R. Quick Connect Wire Harnesses: The Quick Connect wire harness shall have of one four wire connector and one eight wire connector. The four wire connector has two 18AWG and two 24AWG wires. The eight wire connector has eight 24AWG wires Stanley quick connect wire harnesses are available in various length’s, 3” (76mm), 6” (152mm), 12” (304mm), 26” (660mm) 32” (812mm) 38” (965mm), 44” (1117mm), 50” (1270mm) and 192” (4876mm).
 - 1. Wire Harness that is terminated at both ends is specified as WH-size (Example WH-3).
 - 2. Wire Harness that is terminated at one end with exposed pin head at the other is specified as WH-size P (Example WH-3P).

3. Wire Harness 6” (152mm) terminated at one end with bray leads on the other is specified as WH-6E.

Notes The Wire harnesses with suffix “E” has brae wire ends, is used to connect the quick connect harness to a hardwired connection.

Wire harnesses of different lengths may be combined to form a desired length

The maximum size hole needed to pass through the quick connect plug is 1” (25MM).

- S. Provide one wall mounted Telkee, Lund or MMF series key cabinet complete with hooks, index and tags to accommodate 50% expansion. Coordinate mounting location with architect.
- T. Silencers: Furnish silencers on all interior frames, 3 for single doors, 2 for pairs. Omit where any type of seals occur.

2.3 FINISH:

- A. Designations used in Schedule of Finish Hardware - 3.05, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products
- B. Powder coat door closers to match other hardware, unless otherwise noted.
- C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.4 KEYS AND KEYING:

- A. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.
- B. Cylinders, removable and interchangeable core system: Lock Manufacturer’s Patented 7-pin Exterior Openings. Lock Manufacturer’s Standard 7-pin Interior Openings.
- C. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
- D. Transmit Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
- E. Furnish keys in the following quantities:
 1. 1 each Grand Masterkeys
 2. 4 each Masterkeys
 3. 2 each Change keys each keyed core
 4. 15 each Construction masterkeys
 5. 1 each Control keys

- F. The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.
- G. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
 - 1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 HARDWARE LOCATIONS:

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
 - 1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
 - 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
 - 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.3 INSTALLATION:

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Conform to local governing agency security ordinance.
- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
 - 1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

3.4 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
1. Check and adjust closers to ensure proper operation.
 2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
 - a. Verify levers are free from binding.
 - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
 3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.5 SCHEDULE OF FINISH HARDWARE:

Manufacturer List

| <u>Code</u> | <u>Name</u> |
|-------------|---------------------|
| BE | Best Access Systems |
| BY | By Others |
| DM | Dorma Door Controls |
| PR | Precision |
| RO | Rockwood |
| ST | Stanley |
| TR | Trimco |

Option List

| <u>Code</u> | <u>Description</u> |
|-------------|---------------------------------|
| C | QUICK CONNECT WIRING OPTION |
| C | Quick Connect Wiring System |
| TS | TOUCHBAR MONITORING SWITCH |
| CSK | COUNTER SINKING OF KICK and MOP |
| PLATES | |
| LAR | LENGTH AS REQUIRED |
| LDW | LESS DOOR WIDTH |
| MLR | MOTORIZED LATCH RETRACTION |
| NRP | NON REMOVEABLE PIN STD/HEAVY |
| WT HINGE | |
| RQE | Request to Exit |
| VIB | Double Visual Indicator Option |
| EPT Prep | EPT Prep (full mortise) |

B4E-HEAVY-KP BEVELED 4 EDGES - KICK PLATES
 CORMAX PATENTED KEYING Cormax Patented Keying

Finish List

| <u>Code</u> | <u>Description</u> |
|-------------|-----------------------------------|
| AL | Aluminum |
| WB | Wrought Black Powder Coat |
| 613 | Oxidized Satin Bronze, Oil Rubbed |
| 626 | Satin Chromium Plated |
| 630 | Satin Stainless Steel |
| 689 | Aluminum Painted |
| GREY | Grey |
| US26D | Chromium Plated, Dull |

Hardware Sets

SET #001 - AL EXTERIOR KEYPAD

Doors: 107A PAIR

| | | | | |
|---|----------------------|---|-----|----|
| 2 | Continuous Hinge | 661HD UL 83" EPT Prep | AL | ST |
| 1 | Exit Device | C MLR TS 2602 X 2902A | 630 | PR |
| 1 | Exit Device | C MLR TS 2603 X 2903A | 630 | PR |
| 1 | Rim Cylinder | 12E-72 PATD CORMAX PATENTED KEYING | 626 | BE |
| 1 | Operator | ED 900 J8 | 689 | DM |
| 1 | Closer | HD8016 SDS | 689 | BE |
| 1 | Overhead Stop | 910 S | 626 | DM |
| 2 | Actuator | WS 1 | 630 | DM |
| 1 | Power Supply | RPSMLR2BB | | PR |
| 4 | Wire Harness | WH X LAR | | ST |
| 2 | Power Transfer | EPT-12C | | PR |
| 1 | Wiring Diagram | WIRING DIAGRAM FURNISHED BY HWDE. SUPPLIER | | BY |
| 1 | Keypad | KEYPAD BY OWNER'S SECURITY VENDOR | | BY |
| 2 | Door Position Switch | MC4 | | DM |
| 1 | Gasket | GASKETING BY FRAME SUPPLIER | | BY |
| 1 | Threshold | THRESHOLD BY FRAME SUPPLIER | | BY |

NOTE: OPERATIONS NARRATIVE: DOORS NORMALLY CLOSED AND LOCKED. VALID CODE ENTRY RETRACTS LATCHBOLTS FOR INGRESS AND ENERGIZES AUTO OPERATOR. EMERGENCY INGRESS BY KEY. FREE EGRESS AT ALL TIMES. TS SWITCH SHUNTS ALARM. EXIT DEVICE IS FAILS SECURE.

SET #002 - AL EXTERIOR

Doors: 101A PAIR

| | | | | |
|---|----------------------|-----------------------------------|-----|----|
| 2 | Continuous Hinge | 661HD UL X LAR | AL | ST |
| 1 | Exit Device | 2602 X 2902A | 630 | PR |
| 1 | Exit Device | 2608 X 2908A | 630 | PR |
| 1 | Mortise Cylinder | 1E-74 PATD CORMAX PATENTED KEYING | 626 | BE |
| 1 | Closer | HD8016 SDS | 689 | BE |
| 1 | Operator | ED 900 J8 | 689 | DM |
| 1 | Overhead Stop | 910 S | 626 | DM |
| 2 | Door Position Switch | MC4 | | DM |
| 2 | Actuator | WS 1 | 630 | DM |
| 1 | Gasket | GASKETING BY FRAME SUPPLIER | | BY |
| 1 | Threshold | THRESHOLD BY FRAME SUPPLIER | | BY |

SET #002A - AL EXTERIOR

Doors: 109A PAIR

| | | | | |
|---|----------------------|-----------------------------------|-----|----|
| 2 | Continuous Hinge | 661HD UL X LAR | AL | ST |
| 1 | Exit Device | 2602 X 2902A | 630 | PR |
| 1 | Exit Device | 2608 X 2908A | 630 | PR |
| 1 | Mortise Cylinder | 1E-74 PATD CORMAX PATENTED KEYING | 626 | BE |
| 2 | Closer | HD8016 SDST | 689 | BE |
| 2 | Door Position Switch | MC4 | | DM |
| 1 | Gasket | GASKETING BY FRAME SUPPLIER | | BY |
| 1 | Threshold | THRESHOLD BY FRAME SUPPLIER | | BY |

SET #003 - AL EXTERIOR

Doors: 103C

| | | | | |
|---|----------------------|-----------------------------------|-----|----|
| 1 | Continuous Hinge | 661HD UL X LAR | AL | ST |
| 1 | Exit Device | 2402 | 630 | PR |
| 1 | Mortise Cylinder | 1E-74 PATD CORMAX PATENTED KEYING | 626 | BE |
| 1 | Closer | HD8016 SDS | 689 | BE |
| 1 | Door Position Switch | MC4 | | DM |
| 1 | Gasket | GASKETING BY FRAME SUPPLIER | | BY |
| 1 | Threshold | THRESHOLD BY FRAME SUPPLIER | | BY |

SET #004 - FRP EXTERIOR

Doors: 141C, 141D

| | | | | |
|---|----------------------|-------------------------------------|-----|----|
| 1 | Continuous Hinge | 661HD UL X LAR | AL | ST |
| 1 | Exit Device | 2102 | 630 | PR |
| 1 | Rim Cylinder | 12E-72 PATD CORMAX PATENTED KEYING | 626 | BE |
| 1 | Closer | HD8016 SDS | 689 | BE |
| 1 | Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 | Door Position Switch | MC4 | | DM |
| 1 | Gasket | GASKETING BY FRAME SUPPLIER | | BY |
| 1 | Threshold | THRESHOLD BY FRAME SUPPLIER | | BY |

SET #005 - FRP EXTERIOR

Doors: 300A

| | | | | |
|---|----------------------|-------------------------------------|-----|----|
| 1 | Continuous Hinge | 661HD UL X LAR | AL | ST |
| 1 | Exit Device | 2103 X 4903A | 630 | PR |
| 1 | Rim Cylinder | 12E-72 PATD CORMAX PATENTED KEYING | 626 | BE |
| 1 | Closer | HD8016 SDS | 689 | BE |
| 1 | Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 | Door Position Switch | MC4 | | DM |
| 1 | Gasket | GASKETING BY FRAME SUPPLIER | | BY |
| 1 | Threshold | THRESHOLD BY FRAME SUPPLIER | | BY |

SET #006 - FRP EXTERIOR

Doors: 140A

| | | | | |
|---|----------------------|-------------------------------------|-----|----|
| 1 | Continuous Hinge | 661HD UL X LAR | AL | ST |
| 1 | Exit Device | 2103 X 4903A | 630 | PR |
| 1 | Rim Cylinder | 12E-72 PATD CORMAX PATENTED KEYING | 626 | BE |
| 1 | Closer | HD8016 SDS | 689 | BE |
| 1 | Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 | Door Position Switch | MC4 | | DM |
| 1 | Gasket | GASKETING BY FRAME SUPPLIER | | BY |
| 1 | Threshold | THRESHOLD BY FRAME SUPPLIER | | BY |

SET #007 - AL PAIR REMOTE RELEASE

Doors: 102A PAIR

| | | | | |
|---|----------------------|---|-----|----|
| 2 | Continuous Hinge | 661HD UL 83" EPT Prep | AL | ST |
| 1 | Exit Device | C MLR TS 2603 X 2903A | 630 | PR |
| 1 | Exit Device | C TS 2602 X 2902A | 630 | PR |
| 1 | Rim Cylinder | 12E-72 PATD CORMAX PATENTED KEYING | 626 | BE |
| 2 | Closer | HD8016 SDS | 689 | BE |
| 2 | Door Position Switch | MC4 | | DM |
| 2 | Power Transfer | EPT-12C | | PR |
| 1 | Power Supply | RPSMLR2BB | | PR |
| 4 | Wire Harness | WH X LAR | | ST |
| 1 | Intercom System | INTERCOM SYSTEM | | BY |
| 1 | Wiring Diagram | WIRING DIAGRAM FURNISHED BY HWDE. SUPPLIER | | BY |
| 1 | Gasket | GASKETING BY FRAME SUPPLIER | | BY |

NOTE: OPERATIONS NARRATIVE: DOORS NORMALLY CLOSED AND LOCKED. REMOTE RELEASE RETRACTS LATCHBOLT ON ACTIVE LEAF FOR INGRESS. EMERGENCY INGRESS BY KEY. FREE EGRESS AT ALL TIMES. TS SWITCH SHUNTS ALARM. EXIT DEVICE IS FAIL SECURE.

SET #008 - WD EXIT DEVICE

Doors: 141A, 141B

| | | | |
|------------------|-------------------------------------|-------|----|
| 3 Hinges | FBB179 4 1/2 X 4 1/2 NRP | US26D | ST |
| 1 Exit Device | 2108 X 4908A | 630 | PR |
| 1 Rim Cylinder | 12E-72 PATD CORMAX PATENTED KEYING | 626 | BE |
| 1 Closer | HD8016 AF80P | 689 | BE |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #009 - WD KEYPAD

Doors: 107B, 107C

| | | | |
|------------------------|---|-------|----|
| 2 Hinges | FBB179 4 1/2 X 4 1/2 NRP | US26D | ST |
| 1 Electric Hinge | CEFBB179-54 4 1/2 X 4 1/2 NRP | US26D | ST |
| 1 Electro-mech Lock | 9KW3-7DEU15D PATD C CORMAX PATENTED KEYING RQE | 626 | |
| 1 Closer | HD8016 AF80P | 689 | BE |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 1 Door Position Switch | MC4 | | DM |
| 1 Power Supply | PS610RF | | DM |
| 2 Wire Harness | WH X LAR | | ST |
| 1 Wiring Diagram | WIRING DIAGRAM FURNISHED BY HWDE. SUPPLIER | | BY |
| 1 Keypad | KEYPAD BY OWNER'S SECURITY VENDOR | | BY |
| 1 Gasket | GASKETING BY FRAME SUPPLIER | | BY |

NOTE: OPERATIONS NARRATIVE: DOOR NORMALLY CLOSED AND LOCKED. VALID ENTRY CODE RELEASES LOCK LEVER FOR INGRESS. EMERGENCY INGRESS BY KEY. FREE EGRESS AT ALL TIMES. RQE SWITCH SHUNTS ALARM. LOCKSET IS FAIL SECURE.

SET #010 - WD CLASSROOM LOCKSET

Doors: 150A, 150B

| | | | |
|------------------|-------------------------------------|-------|----|
| 3 Hinges | FBB179 4 1/2 X 4 1/2 | US26D | ST |
| 1 Lockset | 9K3-7R15D STD | 626 | BE |
| 1 Closer | HD8016 AF80P | 689 | BE |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #011 - HM ACCESS DOOR

Doors: 149B

| | | | |
|-----------------------------|---------------------------|--|----|
| 1 All Hardware by Door Mfr. | ALL HARDWARE BY DOOR MFR. | | BY |
|-----------------------------|---------------------------|--|----|

SET #012 - WD STOREROOM LOCKSET

Doors: 119A, 122A, 127A, 200A

| | | | |
|---------------------|-------------------------------------|-------|----|
| 3 Hinges | FBB179 4 1/2 X 4 1/2 | US26D | ST |
| 1 Storeroom Lockset | 9K3-7D15D PATD | 626 | BE |
| 1 Closer | HD8016 AF80P | 689 | BE |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #013 - WD STOREROOM LOCKSET

Doors: 110A,139A, 152A

| | | | |
|---------------------|-------------------------------------|-------|----|
| 3 Hinges | FBB179 4 1/2 X 4 1/2 NRP | US26D | ST |
| 1 Storeroom Lockset | 9K3-7D15D PATD | 626 | BE |
| 1 Closer | HD8016 AF80P | 689 | BE |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #013A - WD ENTRANCE/OFFICE LOCKSET

Doors: 110B

| | | | |
|---------------------------|-------------------------------------|-------|----|
| 3 Hinges | FBB179 4 1/2 X 4 1/2 NRP | US26D | ST |
| 1 Entrance/Office Lockset | 9K3-7AB15D STD | 626 | BE |
| 1 Closer | HD8016 AF80P | 689 | BE |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #014 - WD STOREROOM LOCKSET

Doors: 143A, 151A

| | | | |
|---------------------|-------------------------------------|-------|----|
| 3 Hinges | FBB179 5 X 4 1/2 | US26D | ST |
| 1 Storeroom Lockset | 9K3-7D15D PATD | 626 | BE |
| 1 Closer | HD8016 AF80P | 689 | BE |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #015 - WD STOREROOM LOCKSET

Doors: 142A

| | | | |
|----------|----------------------|-------|----|
| 3 Hinges | FBB179 5 X 4 1/2 NRP | US26D | ST |
|----------|----------------------|-------|----|

| | | | |
|------------------|-------------------------------------|------|----|
| 1 Lockset | 9K3-7R15D STD | 626 | BE |
| 1 Closer | HD8016 PH | 689 | BE |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #016 - WD OFFICE LOCKSET

Doors: 111A, 112A, 113A, 114A, 115A, 116A, 117A, 118A, 120A, 121A, 123A, 124A, 125A, 126A, 129A, 130A, 131A, 132B, 133A, 134A, 135A

| | | | |
|---------------------------|----------------------|-------|----|
| 3 Hinges | FBB179 4 1/2 X 4 1/2 | US26D | ST |
| 1 Entrance/Office Lockset | 9K3-7AB15D STD | 626 | BE |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #017 - WD OFFICE LOCKSET

Doors: 128A, 128B

| | | | |
|---------------------------|-------------------------------------|-------|----|
| 3 Hinges | FBB179 4 1/2 X 4 1/2 | US26D | ST |
| 1 Entrance/Office Lockset | 9K3-7AB15D STD | 626 | BE |
| 1 Closer | HD8016 AF80P | 689 | BE |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #018 - WD OFFICE LOCKSET

Doors: 103A, 105A

| | | | |
|---------------------------|-------------------------------------|-------|----|
| 3 Hinges | FBB179 4 1/2 X 4 1/2 NRP | US26D | ST |
| 1 Entrance/Office Lockset | 9K3-7AB15D STD | 626 | BE |
| 1 Closer | HD8016 AF80P | 689 | BE |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #019 - WD OFFICE LOCKSET

Doors: 103B, 105B

| | | | |
|---------------------------|-------------------------------------|-------|----|
| 3 Hinges | FBB179 4 1/2 X 4 1/2 NRP | US26D | ST |
| 1 Entrance/Office Lockset | 9K3-7AB15D STD | 626 | BE |
| 1 Closer | HD8016 PH | 689 | BE |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #020 - WD INDICATOR PRIVACY SET

Doors: 137A, 145A, 148A, 149A

| | | | |
|-------------------------|-------------------------------------|-------|----|
| 3 Hinges | FBB179 4 1/2 X 4 1/2 | US26D | ST |
| 1 Indicator Privacy Set | 45H-0L15H VIB | 626 | BE |
| 1 Closer | HD8016 AF80P | 689 | BE |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Wall Bumper | 1270CV | 626 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #021 - WD INDICATOR PRIVACY SET

Doors: 136A, 138A, 146A, 147A

| | | | |
|-------------------------|-------------------------------------|-------|----|
| 3 Hinges | FBB179 4 1/2 X 4 1/2 | US26D | ST |
| 1 Indicator Privacy Set | 45H-0L15H VIB | 626 | BE |
| 1 Closer | HD8016 SDS | 689 | BE |
| 1 Kick Plate | K0050 10" X 2" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 1 Mop Plate | KM050 4" X 1" LDW B4E-HEAVY-KP CSK | 630 | TR |
| 3 Door Silencers | 1229A | GREY | TR |

SET #022 - AL PAIR PUSH/PULL

Doors: 109B PAIR

| | | | |
|--------------------|-----------------------------|-----|----|
| 2 Continuous Hinge | 661HD UL X LAR | AL | ST |
| 2 Push/Pull Set | 1747 34" | 630 | TR |
| 2 Closer | HD8016 SDS | 689 | BE |
| 1 Gasket | GASKETING BY FRAME SUPPLIER | | BY |

SET #023 - EXTERIOR OVERHEAD DOOR

Doors: 300B, 300C

| | | | |
|------------|---------------------------------------|-----|----|
| 1 Cylinder | 12E-72/1E-74 PATENTED KEYING AS REQ'D | 626 | BE |
|------------|---------------------------------------|-----|----|

SET #024 - INTERIOR SLIDING DOOR

Doors: 106A

| | | | |
|--|-------|--|----|
| 1 Heavy Duty Flat Track Barn Door Hardware By Realcraft | | | |
| 1 Heavy Duty Barn Door Floor Guide Roller By Realcraft | | | |
| 1 Door Pull | AP400 | | TR |
| (Contact Dwayne Davis/dwayne.davis@realcraft.com/253-358-3400) | | | |

Opening List

| <u>Opening</u> | <u>Hdw Set</u> | <u>Opening Label</u> | <u>Door Type</u> | <u>Frame Type</u> |
|----------------|----------------|----------------------|------------------|-------------------|
| 101A PAIR | 002 | | AL | AL |
| 102A PAIR | 007 | | AL | AL |
| 103A | 018 | | WD | HM |
| 103B | 019 | | WD | HM |
| 103C | 003 | | AL | AL |
| 105A | 018 | | WD | HM |
| 105B | 019 | | WD | HM |
| 106A | 024 | | SLIDING | DOOR |
| 107A PAIR | 001 | | AL | AL |
| 107B | 009 | | AL | AL |
| 107C | 009 | | AL | AL |
| 109A PAIR | 002A | | AL | AL |
| 109B PAIR | 022 | | AL | AL |
| 110A | 013 | | WD | HM |
| 110B | 013A | | WD | HM |
| 111A | 016 | | WD | HM |
| 112A | 016 | | WD | HM |
| 113A | 016 | | WD | HM |
| 114A | 016 | | WD | HM |
| 115A | 016 | | WD | HM |
| 116A | 016 | | WD | HM |
| 117A | 016 | | WD | HM |
| 118A | 016 | | WD | HM |
| 119A | 012 | | WD | HM |
| 120A | 016 | | WD | HM |
| 121A | 016 | | WD | HM |
| 122A | 012 | | WD | HM |
| 123A | 016 | | WD | HM |
| 124A | 016 | | WD | HM |
| 125A | 016 | | WD | HM |
| 126A | 016 | | WD | HM |
| 127A | 012 | | WD | HM |
| 128A | 017 | | WD | HM |
| 128B | 017 | | WD | HM |
| 129A | 016 | | WD | HM |
| 130A | 016 | | WD | HM |
| 131A | 016 | | WD | HM |
| 132B | 016 | | WD | HM |
| 133A | 016 | | WD | HM |
| 134A | 016 | | WD | HM |
| 135A | 016 | | WD | HM |

| | | | |
|------|-----|-----------|------|
| 136A | 021 | WD | HM |
| 137A | 020 | WD | HM |
| 138A | 021 | WD | HM |
| 139A | 013 | WD | HM |
| 140A | 006 | FRP | AL |
| 141A | 008 | WD | HM |
| 141B | 008 | WD | HM |
| 141C | 004 | INSULATED | AL |
| 141D | 004 | INSULATED | AL |
| 142A | 015 | WD | HM |
| 143A | 014 | WD | HM |
| 145A | 020 | WD | HM |
| 146A | 021 | WD | HM |
| 147A | 021 | WD | HM |
| 148A | 020 | WD | HM |
| 149A | 020 | WD | HM |
| 149B | 011 | ACCESS | DOOR |
| 150A | 010 | WD | HM |
| 150B | 010 | WD | HM |
| 151A | 014 | WD | HM |
| 152A | 013 | WD | HM |
| 200A | 012 | WD | HM |
| 300A | 005 | FRP | AL |
| 300B | 023 | OVERHEAD | DOOR |
| 300C | 023 | OVERHEAD | DOOR |

SECTION 088000 - GLAZING

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 glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Windows.
 - 2. Doors.
 - 3. Storefronts.
 - 4. Glazed openings.

1.3 DEFINITIONS

- A. Glass Manufacturers: 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.

1.4 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.
 - 1. 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 all applicable building codes.
- B. 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.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data.

1.5 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: 12-inch- square, for each type of glass product indicated, other than monolithic clear float glass.

C. Glazing Schedule: Use same designations indicated on Drawings.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Source Limitations for Glass: Obtain glass from single source from single manufacturer for each glass type.

C. Comply with applicable codes and regulations and with the Consumer Product Safety Commission CPSC 16 CFR 1201 and with applicable recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual."

D. Provide labels showing glass manufacturer's identity, type of glass, thickness, and quality. Labels shall remain on glass until it has been set and approved by the Architect.

E. Safety Glazing Labeling: Where safety-glazing labeling is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

F. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F, and the fire-resistance rating in minutes.

G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 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.

1.9 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

- B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to 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. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
- B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
 2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
 4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.
- D. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AFG Industries, Inc.
 2. AGC Flat Glass North America, Inc.
 3. Guardian Industries Corp.
 4. Pilkington North America
 5. PPG Industries, Inc.

2.2 FLOAT GLASS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
 2. For uncoated glass, comply with requirements for Condition A.
 3. For coated vision glass, comply with requirements for Condition C (other coated glass).

2.3 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.
 2. Spacer: Manufacturer's standard spacer material and construction.
 3. Desiccant: Molecular sieve or silica gel, or blend of both.
- B. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Insulating-Glass Types" Article.

2.4 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.
- 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. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.
- 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.

2.5 GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Elastomeric Glazing Sealants: Provide glazing manufacturer's recommended sealants that comply with ASTM C 920 suitable for applications indicated.

2.6 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 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 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).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.8 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.

2.9 MONOLITHIC-GLASS TYPES

- A. Clear float glass, clear heat-strengthened float glass, and clear fully tempered float glass.

1. Thickness: 6.0 mm.
2. Provide safety-glazing labeling.

2.10 INSULATING-GLASS TYPES

A. Low-e-coated, clear insulating glass.

1. Overall Unit Thickness: 1 inch.
2. Thickness of Each Glass Lite: 6.0 mm.
3. Outdoor Lite: Float glass or heat-strengthened float glass as required.
4. Interspace Content: Argon.
5. Indoor Lite: Fully tempered float glass.
6. Low-E Coating: Pyrolytic on second surface.
7. Visible light transmittance: 70% min.
8. U-Factor: Winter/Nights = .29 max, summer/daytime = .27 max.
9. Solar heat gain coefficient: .38 maximum
10. Provide safety-glazing label.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 2. Presence and functioning of weep systems.
 3. Minimum required face and 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.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

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. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- 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 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.
 - 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. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- K. 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.
- L. 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 right 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. Cut compression gaskets to 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. Installation with Drive-in Wedge Gaskets: 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. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 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.

3.8 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. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing 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.

3.9 GLAZING SCHEDULE

- A. Tempered Glass
 1. TG-1: Tempered Glass, 1/4" thickness.
 2. TG-2: Tempered Glass, 3/8" thickness.
- B. Insulated Glass
 1. IG: Insulated Glass, 1" (inch) overall thickness indoor and outdoor lites of heat strengthened float glass.
 2. IT: Insulated Tempered Glass, 1" (inch) overall thickness indoor and outdoor lites of fully tempered float glass.

END OF SECTION 088000

09

FINISHES

DIVISION

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SECTION 092216 - NON-STRUCTURAL METAL 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. This Section includes non-load-bearing steel framing members for the following applications:
 - 1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).
 - 2. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, 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.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, G40 hot-dip galvanized, unless otherwise indicated.

2.2 SUSPENSION SYSTEM COMPONENTS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
 - a. Type: Postinstalled, expansion anchor.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.
- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0598 inches minimum 7/16-inch wide flanges.
 - 1. Depth: 1-1/2 inches
- E. Furring Channels (Furring Members):
 - 1. Cold-Rolled Steel Channels: 0.0598-inch bare-steel thickness, with minimum 7/16-inch wide flanges, 3/4 inch deep.
- F. Locations:
 - 1. Exterior suspended portland cement plaster soffits.
 - 2. Interior suspended portland cement plaster ceilings.

2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES

- A. Steel Studs and Runners: ASTM C 645.
 - 1. Minimum Base-Metal Thickness: 0.0312 inch.
 - 2. Depth: As indicated on Drawings.
- B. Slip-Type Head Joints: Where indicated, provide the following:
 - 1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
 - 2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
 - 3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

- C. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated, or if not indicated as required for wall mounted casework and other wall mounted fixtures and accessories.
 - 1. Minimum Base-Metal Thickness: 0.0312 inch.
- E. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 1. Minimum Base Metal Thickness: 0.0312 inch
 - 2. Depth: As indicated on Drawings.
- F. Single-Leg Resilient Furring Channels:
 - 1. Minimum Base-Metal Thickness: 0.0232 inch
 - 2. ½-inch (13-mm) deep, steel sheet members designed to reduce sound transmission.
 - 3. Configuration: Hat Shaped

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide the following:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details and with gypsum manufacturers written recommendations.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.
- E. Do not support any framing off the underside of metal floor or roof decks. All support must be from structural members. Metal deck surfaces can be used for lateral bracing attachments only.

3.4 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

- a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.5 INSTALLING FRAMED ASSEMBLIES

- A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- B. Install studs so flanges within framing system point in same direction.
 1. Space studs as follows:
 - a. Single-Layer Application: 16 inches o.c., unless otherwise indicated.
- C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb, unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.

- c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
- 3. Other Framed Openings: Frame all openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
- 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- D. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

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. This Section includes the following:
 - 1. Interior gypsum board.
 - 2. Exterior gypsum board.
 - 3. Gypsum board accessories.
- B. Related Sections include the following:
 - 1. Section 072100 "Thermal Insulation" for insulation and vapor retarders installed in assemblies that incorporate gypsum board.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 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. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 - 3. Simulate finished lighting conditions for review of mockups.

4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

1.5 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.

1.6 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. Recycled Content: Provide gypsum panel products with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 10 percent by weight.
- B. 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Georgia-Pacific Gypsum LLC.

- b. Lafarge North America Inc.
 - c. National Gypsum Company.
 - d. USG Corporation.
- B. Basis of Design: Gold Bond® BRAND Gypsum Board
- 1. Panel Physical Characteristics
 - a. Core: Regular gypsum core
 - b. Surface paper: 100 percent recycled content paper on front, back and long edges
 - c. Long Edges: Tapered
 - d. Overall thickness: 1/2 inch
 - e. Panel complies with requirements of ASTM C 1396
- C. Basis of Design: Gold Bond® BRAND Fire-Shield® Gypsum Board
- 1. Type X, Panel Physical Characteristics
 - a. Core: Fire-resistance rated gypsum core
 - b. Surface paper: 100 percent recycled content paper on front, back and long edges
 - c. Long Edges: Tapered
 - d. Overall thickness: 5/8 inch
 - e. Panel complies with Type X requirements of ASTM C 1396
- D. Basis of Design: Gold Bond® BRAND eXP® Tile Backer
- 1. Panel Physical Characteristics
 - a. Core: Mold and moisture resistant, Fire-Shield Type X, gypsum core
 - b. Thickness: 1/2 inch & 5/8 inch, Type X
 - c. Facer: Fiberglass Mat; moisture resistant, acrylic coated water barrier on front
 - d. Long Edges: Square
 - e. Water Absorption: less than 5 percent when tested in accordance with ASTM C 473
 - f. Combustibility: Noncombustible when tested in accordance with ASTM E 136
 - g. Flame spreads/Smoke Developed: 0/0 when tested in accordance with ASTM E 84
 - h. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273
 - i. Panel complies with requirements of ASTM C 1178.
- E. Moisture- and Mold-Resistant Type: Complying with ASTM C1396 with moisture and mold-resistant core and surfaces.
- 1. Core: 5/8 inch, Type X.
 - 2. Long Edges: Tapered.
 - 3. Moisture and Mold-Resistant Type: All vestibule ceilings indicated to be gypsum board or where moisture could be present along with gypsum board finishes.

2.3 EXTERIOR GYPSUM BOARD

A. Basis of Design: Gold Bond® BRAND eXP® Sheathing

1. Panel Physical Characteristics

- a. Core: Regular gypsum core, with additives to enhance moisture and mold resistance.
- b. Thickness: 5/8 inch
- c. Facer: Water-resistant glass mat on both face and back surfaces.
- d. Long Edges: Wrapped with water repellent glass mat.
- e. Water Absorption: less than 5 percent when tested in accordance with ASTM C 473
- f. Combustibility: Noncombustible when tested in accordance with ASTM E 136
- g. Flame spreads/Smoke Developed: 5/0 when tested in accordance with ASTM E 84
- h. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273
- i. Panel complies with requirements of ASTM C 1177 and C 1396.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. Expansion (control) joint.
 - e. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.

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 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 setting-type taping 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.

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. Fasteners: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Use screws complying with ASTM C 1002, unless otherwise indicated.
- D. Sound Attenuation Blankets: As specified in Division 07 Section "Thermal Insulation."
 - 1. Recycled Content: Provide blankets with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 10 percent by weight.
- E. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."
- F. Reveals:
 - 1. Reveal Picture Hanger: Basis of Design Fry Reglet "DRMH", or approved equal.
 - a. Material: Extruded aluminum.
 - b. Dimensions: As indicated on Drawings.
 - c. Locations: As indicated on Drawings.
 - d. Hangers: Provide one snap-in hanger clip for each 1'-0" of hanger length.
 - e. Installation: Refer to Manufacturer's recommendations.
 - 2. Snap-in Reveal: Basis of Design Fry Reglet "625-75 with DRM-SNAP-IN625", or approved equal.
 - a. Material: Extruded aluminum.
 - b. Dimensions: As indicated on Drawings.
 - c. Locations: As indicated on Drawings.
 - d. Installation: Refer to Manufacturer's recommendation.

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. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. 5/8" Type X: Typical on vertical and horizontal surfaces unless noted otherwise on drawings.
 - 2. 5/8" Tile Backer Type: Typical on vertical and horizontal surfaces with tile finishes.
- B. 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.

3.4 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 at locations indicated on Drawings or if not indicated, according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners.
 2. LC-Bead: Use at exposed panel edges.
 3. L-Bead: Use where abutting different materials.
 4. Expansion (control) joint: Use at indicated or specified gypsum wallboard control joints.
 5. Curved-Edge Cornerbead: Use at curved or arched edges.

3.5 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 and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 3: Where wall surface is covered by material other than paint.
 3. Level 4: On all exposed gypsum board surfaces.
 4. Level 5: On all exposed gypsum board surfaces in Room 108 Hall.

3.6 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.
 - 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.

END OF SECTION 092900

SECTION 093000 - TILING

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. Porcelain tile.
- 2. Ceramic tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples:
 - 1. Each type and composition of tile and for each color and finish required.
 - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as 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.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications:

1. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.2 TILE PRODUCTS – Refer to Room Finish Schedule

- A. Porcelain Tile Type: Color thru porcelain tile [T-1]
 1. Basis of Design: Trinity Tile “Bourne”, or approved equal.
 2. Face Size: 12 by 24 inches.
 3. Thickness: 8.5mm.
 4. Dynamic Coefficient of Friction: Not less than 0.42.
 5. Finish: Matte.
 6. Tile Color: As selected by Architect from manufacturer's full range.
 7. Grout Color: As selected by Architect from manufacturer's full range.
 8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Cove Base: 6 x 12 inch.
 - b. Transition: Schluter “Reno-U”, or approved equal.
 9. Rep Info: Jennifer Winkler, Trinity Tile/Source One Contract, Phone: (937)369-4878.
- B. Ceramic Tile Type: Ceramic wall tile [T-2]
 1. Basis of Design: Trinity Tile “Poblano”, or approved equal.
 2. Face Size: 4” x 10”.
 3. Thickness: .25 inch.
 4. Finish: Glossy
 5. Tile Color: As selected by Architect from manufacturer's full range of crackled color choices. (Must include Blue Steel as a color choice)
 6. Grout Color: As selected by Architect from manufacturer's full range.
 7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Transition: Schluter “Jolly”, or approved equal at all exposed edges.

8. Rep Info: Jennifer Winkler, Trinity Tile/Source One Contract, Phone: (937)369-4878.

2.3 SETTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
- B. Modified Dry-Set Mortar (Thinset): ANSI A118.4.
 1. Mapei, TEC, Texrite or approved equal.
 2. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.
 3. For wall applications, provide non-sagging mortar.

2.4 GROUT MATERIALS

- A. Epoxy Grout: ANSI A118.3,. Basis of Design: Laticrete “SPECTROLOCK 2000IG”, or approved equal.
 1. Architect to select colors from manufacturers full standard range. Architect shall not be limited to number of grout colors chosen.

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 the Work.
 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Blending: For tile exhibiting color variations, 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.

3.3 CERAMIC/PORCELAIN TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. 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.
- C. 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.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Wall Tile: 3/16 inch.
 - 2. Floor Tile: 1/8 inch.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 - 2. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in improved modified dry-set mortar (thinset).
 - 3. Fill joints between such thresholds and adjoining tile set with elastomeric sealant.
- J. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

END OF SECTION 093013

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

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. This Section includes acoustical panels, exposed suspension systems for ceilings, and perimeter trim.
- B. Baffle System and suspension method.

1.3 DEFINITIONS

- A. AC: Articulation Class.
- B. CAC: Ceiling Attenuation Class.
- C. LR: Light Reflectance coefficient.
- D. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - 1. Acoustical Panel: Set of 6-inch- square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- long Samples of each type, finish, and color.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
- D. Maintenance Data: For finishes to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Panels shall meet the minimum performance criteria:

1. ASTM E 1264 for Class A materials.
 2. Moisture Resistance: No visible sag under 90% to relative humidity and 104 degrees F.
- B. Source Limitations:
1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
 2. Suspension System: Obtain each type through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - a. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
 - b. Identify materials with appropriate markings of applicable testing and inspecting agency.
 2. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
- D. Seismic Standard: This project is located on a site of Seismic Design Category B per the Ohio Building Code. Design and install ceiling system per CISCA 0-2. Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:
1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
 2. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings--Seismic Zones 0-2."
 3. ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.8 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.9 EXTRA MATERIALS

- A. Provide 48 sq. ft. of each type of acoustical unit for use in maintenance of project. This extra material is NOT to be used for any repair or replacement required during the construction period.
- B. Replacement Stock: In addition to the maintenance stock, provide 1 (one) percent replacement stock of each type of acoustical unit. Use replacement stock to replace damaged materials during a 60 (sixty) day period following Substantial Completion when the responsible party for the damage cannot be determined. Remaining replacement stock is to be turned over to the Owner.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

- A. Low-Emitting Materials: Acoustical panel ceilings 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. Recycled Content: Provide acoustical panels with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 10 percent by weight.

- C. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
 - 1. Moisture Resistance: No visible sag under these conditions: 99% relative humidity and 119 degrees F.
 - 2. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.
- D. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
- E. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING [A-]

- A. Products: Subject to compliance with requirements, provide one of the products specified in the Acoustical Panel Ceiling Schedule at the end of this section.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Recycled Content: Provide products made from steel sheet with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
- C. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
 - 1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance". Main beam and cross tees for ceiling types APC-1, APC-2, APC-5, APC-6 and APC-7 shall be hot-dip galvanized steel with G30 or greater coating. Main beams and cross tees for ceiling types APC-3 and APC-4 shall be hot dip galvanized steel with G60 or greater coating.
- D. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.
- F. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces if required.
- G. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces if required.
- H. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in-place if required.
- I. Hold-Down Clips: Provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.
1. In Vestibules and within 20-foot radius of exterior doors.
- J. Impact Clips: Provide manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.
1. In Locker Rooms and associated rooms included in gymnasium locker room suites.

2.4 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

- A. Products: Subject to compliance with requirements, provide products by one of the following:
1. Armstrong World Industries, Inc.
 2. Chicago Metallic Corporation.
 3. USG Interiors, Inc.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 or G60 coating designation, with prefinished 15/16-inch- wide metal caps on flanges.
1. Structural Classification: Intermediate-duty system.
 2. End Condition of Cross Runners: Override (stepped) type.
 3. Face Design: Flat, flush.
 4. Cap Material: Steel or aluminum cold-rolled sheet.
 5. Cap Finish: (Steel) low gloss White finish for ceiling types APC-1, 2, 3, 5, 6, and 7; (Aluminum) low gloss white finish for ceiling type APC-4.
- C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated. Hem both edges of moldings and trim. Wall moldings shall have a width of not less than 15/16-inches.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
3. For sloped ceilings, provide edge moldings, custom formed without kinks or waviness, to match ceiling type.
4. For curved ceilings, provide edge moldings, custom formed with kinks or waviness, to match shape of abutting walls and bulkheads.
5. Bullnose Corner Cover: For nominal 15/16-inch molding; snap over molding to trim outside corners; fits 1-inch radius block.
6. Outside Corner Cover: Match width of adjacent edge molding; snap over molding to trim outside corners.

D. Extruded Aluminum Perimeter Trim: Where indicated, provide manufacturer's extruded-aluminum perimeter moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:

1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221 for Alloy and Temper 6063-T5.
2. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils. Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
3. Location: At acoustic panels in Cafetorium and Instrumental Music.
4. Trim channel profile: Straight.
5. Height: Nominal 6-inch.
6. Color: Selected by Architect from manufacturer's full range of colors.
7. Provide Manufacturer's standard accessories including; 6-inch outside corner post, 6-inch inside corner, hanging clips, and splices.

2.5 METAL SUSPENSION SYSTEM FOR GYPSUM BOARD CEILING ATTACHMENT

A. Products: Subject to compliance with requirements, provide products by one of the following:

1. Armstrong World Industries, Inc.
2. Chicago Metallic Corporation.
3. USG Interiors, Inc.

B. Manufacturer's standard system components designed for fixing of gypsum board panels to a concealed suspended grid system, containing the following:

1. Main Beam: Shall be double-web construction (minimum 0.0179 inch prior to protective coating), hot dipped galvanized (per ASTM A653).
 - a. 1-1/2 inch web height, prefinished 15/16 inch flange with minimum G40 hot dipped galvanization

- b. 1-11/16 inch web height, 1-1/2 inch flange, available with G40 or G90 hot dipped galvanization.
 - c. 1-11/16 inch web height with pre-cut facets (8 inches on center) for radius installations, 1-1/2 inch flange.
 - d. 1-11/16 inch web height with pre-cut facets (8 inches from ends, then 16 inches on center) for radius installations, 1-1/2 inch flange.
 2. Primary Cross Tees: Shall be double-web steel construction (minimum 0.0179 inch prior to protective coating), hot dipped galvanized (minimum G40 or G90 per ASTM A653), web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange.
 3. Secondary Framing Cross Tees: Shall be double web steel construction (minimum 0.0179 inch prior to protective coating), hot dipped galvanized (minimum G40, web height 1-1/2 inch rectangular bulb and 15/16 inch flange.
 4. Tees designed for creating soffits: 1-1/2 inch web height. 1-1/2 inch flange, flattened bulb, bending crimp, knockouts and alignment holes to facilitate creating 15, 30, 45, 60 and 90 degree angles; available with G40 or G90 hot dipped galvanization.
 - a. 10 foot tee with knockouts 6 inches on center
 - b. 10 foot tee with knockouts 8 inches on center
5. Wall Molding:
 - a. 12 foot Locking Angle Molding, 1-1/4 inch x 1-1/4 inch with pre-engineered locking tabs punched 8 inches on center, knurled surface, screw stop hem, pre-punched holes in top flange.
 - b. 12 foot Knurled Angle molding, 1-1/4 inch x 1-1/4 inch, knurled surface, screw stop hem, pre-punched holes in top flange.
 - c. 10 foot Knurled Angle molding, 1-1/4 inch x 1-1/4 inch, knurled surface, screw stop hem, pre-punched holes in top flange.
 - d. Hot dipped galvanized (minimum G40), unhemmed channel molding, 3/4 inch x 1-9/16 inch x 1-1/4 inch flange.
6. Clips:
 - a. Main Beam Adapter Clip
 - b. Drywall Attachment Clip for transitions to acoustical ceilings
 - c. Drywall Angle Clips - Available in 30 degree, 45 degree, 60 degree and 90 degree angles.
 - d. Cross Tee Adapter Clip
 - e. Radius Clip - Required to cover all pre-cut facets, including those not being clipped.
7. Screws for wallboard application shall be bugle head screws in accordance with thickness of material used.

C. Structural Classification:

1. Main Beam shall be heavy duty per ASTM C 635.
2. Classification can require wires to be closer together for additional loading when used to support double layer gypsum, verticals, slopes, domes, half barrels, circles, soffits, canopies, and step conditions which call for loading or unusual designs and shapes in

drywall construction. Using cross tees in the construction of circles, barrels, etc. is common in order to hold the radius.

3. Deflection of fastening suspension system supporting light fixtures, ceiling grilles, access doors, verticals and horizontal loads shall have a maximum deflection of 1/360 of the span.

2.6 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, non-hardening, non-skinning, nonstaining, gunnable, synthetic-rubber sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), recommended for sealing interior concealed joints to reduce airborne sound transmission.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook." Comply with CISCA 0-2.
- B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to postinstalled mechanical or adhesive anchors.
 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 2. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

ACOUSTICAL PANEL CEILING SCHEDULE

Basis of Design:

A-1: Corridors

Armstrong: #1940 Ultima High NRC

Size: 2' x 2' x 7/8"

NRC: .80

CAC: minimum 35

Color: White

Light Reflectance: 0.88

Edge Profile: 15/16" Square Lay-in

A-2: Offices

Armstrong: #1943 Ultima High NRC

Size: 2' x 4' x 7/8"

NRC: .80

CAC: minimum 35

Color: White

Light Reflectance: 0.88

Edge Profile: 15/16" Square Lay-in

A-3: Storage Rooms/Miscellaneous

Armstrong: #1729 Fine Fissured

Size: 2' x 4' x 5/8"

NRC: .55

CAC: minimum 35

Color: White

Light Reflectance: 0.82

Edge Profile: 15/16" Square Lay-in

A-4: Waiting

Armstrong: ACGI Wood Walls and Ceilings Baffle System, or approved equal; Refer to Drawings for overall dimensions and locations.

Series: 1 [WB1] four square sides

Material: Wood Veneer; Natural Ash

Baffle Thickness: 2 inches

Baffle Depth: 3.5 inches

Blades per Foot: 4

Suspension Method: Notched Wood Backer

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

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 the following products:
 - 1. Resilient base (RB)
 - 2. Resilient molding accessories.
- B. Related Sections:
 - 1. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

1.4 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F, in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Manufacturer must be the same manufacturer as Rubber Tile specified in Division 09 “Resilient Tile Flooring”. All products in this Section must be from one single manufacturer. Subject to compliance with requirements, provide products by one of the following:
 - 1. Burke Mercer Flooring Products.
 - 2. Tarkett.
 - 3. Roppe Corporation, USA.

2.2 RESILIENT BASE [RB]

- A. Resilient Base Standard: ASTM F 1861.
 - 1. Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
 - 2. Manufacturing Method: Group I (solid, homogeneous).
 - 3. Style: cove base with toe.
- B. Minimum Thickness: 0.125 inch.

- C. Height: 4 inches or as indicated on Drawings.
- D. Lengths: Coils in manufacturer's standard length, but not less than 96 feet.
- E. Outside Corners: Preformed.
- F. Inside Corners: Preformed.
- G. Finish: Satin
- H. Colors and Patterns: As selected by Architect from full range of industry colors.

2.3 RESILIENT MOLDING ACCESSORY

- A. Description: Joiner for resilient tile and carpet, divider for ceramic and carpet, reducer strip for resilient flooring, reducer strip for carpet.
- B. Material: Rubber
- C. Items:
 - 1. Joiner for resilient tile and carpet
 - a. Burke #150
 - b. Johnsonite #CTA-XX-C
 - c. Roppe #50
 - 2. Divider for ceramic/carpet
 - a. Burke #153
 - b. Johnsonite #CCA-XX
 - c. Roppe #60
 - 3. Reducer strip for resilient flooring
 - a. Burke #633
 - b. Johnsonite #RRS-XX-D
 - c. Roppe #22
 - 4. Reducer strip for carpet
 - a. Burke #705
 - b. Johnsonite #EG-XX-G
 - c. Roppe #39
- D. Colors and Patterns: Selected by Architect from full range of industry colors.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. VOC Content: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Resilient Base Adhesives: Not more than 50 g/L.
 - b. Rubber Floor Adhesives: Not more than 60 g/L.
- C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.
- D. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
 - 4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

- a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Outside Corners: Install premolded corners before installing straight pieces. Preformed outside corners or job-formed outside corners shall not be permitted.
- H. Inside Corners: Install job-formed or preformed corners. Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products until Project Completion.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

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 the following products:
 - 1. Luxury Vinyl Tile (LVT)
- B. Related Sections:
 - 1. Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 1. Show details of special patterns.
- C. Samples for Initial Selection: For each type of floor tile indicated.
- D. Samples for Verification: Full-size units of each color and pattern of floor tile required.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.
- B. Fire Test Performance: Unless otherwise indicated, provide flooring material to meet the following fire test performance criteria as tested by a recognized independent testing laboratory.
 - 1. ASTM E 648 (Critical Radiant Flux) of 0.45 watts per sq.cm. or greater, Class I.
 - 2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less.

- C. Provide adequate testing of concrete slabs, including relative humidity testing.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination". Flooring installer and manufacturer's representative are required to attend.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive floor tile but not less than 65 deg. F or more than 85 deg. F in spaces during the following time periods.
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Do not install resilient tile over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by resilient tile manufacturer or the following, whichever is more restrictive:
 - 1. Concrete subfloors must meet the following requirements before resilient tile may be installed:
 - a. pH range of 5 to 9.
 - b. Moisture-emission rate of 3-lb/1000 sq. ft. per 24 hours or less.
- C. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer but not less than 55 deg. F or more than 85 deg. F.
- D. Close spaces to traffic during floor tile installation, and for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

PART 2 - PRODUCTS

2.1 LUXURY VINYL TILE FLOORING

- A. Products: Subject to compliance with requirements, provide Luxury Vinyl Tile (LVT) from one of the following:
 - 1. Basis of Design: J&J Flooring Group; “Make Your Mark” high performance luxury vinyl tile.
- B. Tile Standard: ASTM F 1700, Class III
- C. Meets ASTM F970 static load limits
- D. Wear Layer Thickness: Not less than 20 mil
- E. Overall Thickness: Not less than 5mm
- F. Size: 9” x 48”
- G. Warranty: Not less than 10 year limited commercial wear warranty
- H. Colors and Patterns: Selected by Architect from full range of industry colors

2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Install tile flooring with adhesive recommended by the manufacturer for the site conditions and follow adhesive label for proper use.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

3.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 4. Moisture Testing: Perform tests recommended by floor covering manufacturer and as follows. Proceed with installation only after substrates pass testing.
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have passed resilient tile flooring manufacturer's requirements. Results not to exceed 80%.
 - c. When testing proves slab conditions unfit for flooring installation, provide proper adhesive products and / or moisture remediation for the given condition as recommended by the manufacturer.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until they are same temperature as space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.4 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles square with room axis.

- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern) unless otherwise indicated and in pattern of colors and sizes indicated.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections. Floor covering shall not be installed over expansion joints.
- I. Remove all floor tiles that show imperfections telegraphing from the substrate below, repair the substrate, and replace with new matching tile.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile products from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover and protect floor tile until Project Completion.

END OF SECTION 096519

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SECTION 096813 - TILE CARPETING

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 modular, tufted carpet tile.
- B. Related Sections:
 - 1. Division 09 Section "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to carpet installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include installation recommendations for each type of substrate.
- B. Shop Drawings: Show the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.

7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. 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 Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch long Samples.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, 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 tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

B. 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.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II or Master II certification level.

B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.

1.10 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- 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 or the following, whichever is more restrictive:
1. Concrete subfloors must meet the following requirements before carpet may be installed:
 - a. pH range of 5 to 9.
 - b. Moisture-emission rate of 3-lb/1000 sq. ft. per 24 hours or less.

1.11 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE [CT-1]

- A. Products: Subject to compliance with requirements, provide Carpet Tile CT-1 from one of the following:
1. Basis of Design: Atlas Masland; “Transitions/Grand Entrance”.
- B. Color: As selected by Architect from manufacturer's full range.
- C. Yarn Type: Nylon 6,6
- D. Finished Pile Height: Not less than 0.188”

- E. Gauge: 1/12
- F. Tufted Face Weight: Not less than 20-oz./sq. yd.
- G. Soil Retardant: Permanent built-in stain and soil protection
- H. Backing: Perma-tile vinyl backing system with recycled content
- I. Tile Size: 12” x 36”
- J. Performance Characteristics: As follows:
 - 1. NBS Smoke: Less than 450 Flaming Mode per ASTM E-662.
 - 2. Flammability: Class I (Radiant Panel Test) per ASTM E-668.
 - 3. Colorfastness to Crocking: Not less than 4, wet and dry, per AATCC 165.
 - 4. Colorfastness to Light: Not less than 4 after 60 AFU (AATCC fading units) per AATCC 16, Option E.
 - 5. Colorfastness to Ozone: Not less than 4 after 2 cycles per AATCC 129.
 - 6. Colorfastness to Water: Not less than 4 (AATCC transference scale) (yarn dyed carpet) (grade change in color and staining) per AATCC 107.
 - 7. Electrostatic Propensity: Less than 3.5 kV per AATCC 134.
 - 8. Emissions: Provide carpet that complies with testing and product requirements of CRI's "Green Label Plus" program.
 - 9. Emissions: Provide carpet that complies with the 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 CARPET TILE [CT-2]

- A. Products: Subject to compliance with requirements, provide Carpet Tile CT-2 from one of the following:
 - 1. Basis of Design: AtlasMasland; “Get a Grip”.
- B. Color: As selected by Architect from manufacturer’s full range.
- C. Yarn Type: Nylon, solution dyed
- D. Gauge: 1/10
- E. Tufted Yarn Weight: Not less than 30-oz./sq. yd.
- F. Tile Size: 24” x 24”

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and that is recommended by carpet tile manufacturer for releasable installation.
 - 1. Adhesives 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. VOC Content: Provide adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

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.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- 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. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile 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 tile manufacturer.
- E. Extend carpet tile 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.

3.4 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting 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 and carpet adhesive manufacturer

END OF SECTION 096813

SECTION 097200 - WALL COVERINGS

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. Vinyl wall covering.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: Full range of all available colors and patterns. Sample size must be a minimum of 12 inches square. Larger samples may be requested by the Architect to finalize selection.
- C. Product test reports.
- D. Maintenance Data: For wall coverings to include in maintenance manuals.

1.4 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Wall-Covering Materials: For each type, full-size units equal to 5 percent of amount installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

- a. Passes Class “A” NFPA 101 Life Safety Code.
 2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 286.
- 2.2 VINYL WALL COVERING VWC:
- A. Basis of Design: Tower “Grass Envy”, or prior approved equal.
 - B. Description: Provide products in rolls from same production run and complying with the following:
 1. Federal Specification CCC-W-408D for Type II wallcoverings.
 2. ASTM F793 for wall coverings.
 - C. Total Weight: 20.0 oz.
 - D. Width: 52-inches/132 cm.
 - E. Backing: Osnaburg fabric.
 - F. Match: Reverse, random.
 - G. Colors, Textures, and Patterns: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 3. Metals: If not factory primed, clean and apply primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 4. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 5. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.

- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.2 WALL-COVERING INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
- D. Install wall covering with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.
- E. Install seams vertical and plumb at least 6 inches (150 mm) from outside corners and 6 inches (150 mm) from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.
- F. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- G. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
- H. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- I. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

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SECTION 098413 – ACOUSTICAL WALL TREATMENT

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 back-mounted acoustical wall panels

1.3 DEFINITIONS

- A. NRC: Noise reduction coefficient. Arithmetic average of absorption coefficients in four speech related octave bands (250, 500, 1,000, 2000 Hertz).
- B. AWT: Acoustical wall treatment
- C. Absorption Coefficient: Percent of sound absorbed by product in octave bands, per standard test methods, (ASTM typically).

1.4 SUBMITTALS

- A. Product Data: For each type of panel edge, core material, and mounting indicated.
- B. Shop Drawings: For acoustical wall panels. Include mounting devices and details at panel head, base, joints, and corners and details at ceiling, floor base, and wall intersections. Include elevations showing panel sizes, direction of fabric weave and pattern matching.
- C. Samples: For the following products. Prepare Samples from same material to be used for the Work.
 - 1. Fabric: Full-width by 36-inch long Sample from dye lot to be used for the Work, and as follows:
 - a. With specified treatments applied.
 - b. Show complete pattern repeat.
 - c. Mark top and face of fabric.
 - 2. Panel Edge: 12-inch- long Sample showing edge profile, corner, and finish.
 - 3. Core Material: 12-inch- square Sample showing corner.
 - 4. Mounting Device: Full-size Sample.
 - 5. Sample Panels: No larger than 36 by 36 inches. Show joints and mounting methods.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain AWP from approved multiple selections/sources as listed herein by manufacturer. Apply all specified requirements to selection of manufacturers product.
- B. Fire-Test-Response Characteristics: Provide acoustical wall panels with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and acoustical wall panel manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and panels in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.
- C. Protect panel edges from crushing and impact.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical wall panels until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of acoustical wall panels that fail in performance, materials, or workmanship within specified warranty period.
 - 1. Failure in performance includes, but is not limited to, acoustical performance.
 - 2. Failures in materials include, but are not limited to, fabric sagging, distorting, or releasing from panel edge; warping of core, or finish degrading within warranty period.
 - 3. Warranty Period: Two (2) years from date of Substantial Completion.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below, that are packaged with protective covering for storage and labeled for contents.
 - 1. Fabric: For each fabric, color, and pattern installed provide length equal to 5 percent of amount installed, but no fewer than 5 yards.

PART 2 - PRODUCTS

2.1 CORE MATERIALS

- A. Glass-Fiber Board: ASTM C 612, Type IA or Types IA and IB; density as specified, unfaced, dimensionally stable, molded rigid board, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong.
 - 2. Conwed Designscape.
 - 3. Kinetics Noise Control.
 - 4. ESSI Acoustical Products Co.
- B. General Requirements for Sound-Absorbing Wall Units: Provide sound-absorbing wall panels that 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," including 2004 Addenda.

2.3 PRODUCTS - FUNCTIONAL DESCRIPTION

- A. Acoustic Wall Panels (Absorptive): Provide room absorption, treatment and noise reduction with wall panels placed uniformly and plumb, per drawings. Provide full support for panels to prevent any warp, sag or bow. Placements and spacing shall conform to wall conditions for symmetrical coverage and “banding” or grouping as shown on drawings. Cutouts shall be carefully coordinated or plated as required. Butt panels end to end for a contiguous surface, and center in a symmetrical fashion along wall, unless indicated otherwise.
- B. Fabrication: Back-Mounting Devices - Concealed on backside of panel, recommended to support weight of panel, with base-support bracket system where recommended by manufacturer for additional support of panels, and as follows:
 - 1. Adhesive. Use only adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Panels shall be Class A fire rated, in accordance with ASTM E-84 standard test method for surface burning of building materials. Meet all building and local or state fire codes, and comply with current project specifications for fire ratings. Product shall be abuse and tear resistant and useful for indoor applications. No fabric covered panels of any kind shall be installed without meeting fire code, and surface burning requirements with flame spread typically 25 or less, and smoke development of 50 or less. If specifications are conflicted, use more stringent local codes.
 - 3. Panel dimensions shall be a minimum of two (2) inch thickness with chemically hardened edges, and have minimum core density of 7 lb./cubic foot density core of fiberglass, and covered with acoustically transparent polyester, polypropylene, or polyolefin fiber/ or

fabric wrapped as selected by Architect. Panels shall have dimensional stability for stiff and secure mountings, free from being moved ajar, knocked or struck.\

4. Mechanical mounting shall be with factory provided clips and wall Z-bracket or concealed spline with adhesives. Impaling clips are not permitted. Use construction adhesives as necessary for placing and sizing with leveling brackets which are mandatory when using adhesives. Do not use magnets, hoop and loop, or other adhesive methods.
5. Examine substrates for compliance with requirements and tolerances, and do not proceed until unsatisfactory conditions have been corrected.
6. Standards shall be ASTM C423 for mounting types and noise reduction, with “A”, or “D” type mountings depending on spacing of panels or as required per plans.
 - a. Acoustical absorption performance, (referenced for 2 inch depth (Class A Mount), is:
 - 1) Absorption coefficients shall exceed 125 Hz - 0.30; 250 Hz – 0.71; 500 Hz. – 1.20; 1,000 Hz. – 1.29; 2,000 Hz. – 1.22; 4,000 Hz. - 1.24, and in accordance with ASTM #C423-84a for test method and mounting. NRC value shall be at or greater than 0.99.
 - b. Standards shall be ASTM C423 for mounting types and noise reduction, with “A” or “D” mountings, depending on furring out of panels as required per plans.

2.4 ACOUSTICAL WALL TREATMENT [AWT]

A. General:

1. Minimum Recycled Content: Provide sound-absorbing wall units with postconsumer recycled content plus one-half of preconsumer recycled content of 20 percent by weight.
2. Regional Materials: Provide sound-absorbing wall units that have been manufactured within 500 miles of Project site.

B. Size: Widths and heights as indicated on the drawings by one (1) inch thick.

C. Mounting: Z clips / spot adhesive.

D. Edges and corners: Square.

E. Flame Spread: Class A.

F. Construction: Glass fiber core, internal edge protection, with full fabric wrap.

1. Adhesives: As recommended by sound-absorbing wall unit manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesives: As recommended by sound-absorbing wall unit manufacturer and that 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," including 2004 Addenda.

G. Fabric Facing Material: Guilford of Maine, FR701-2100 line of acoustic fabric.

- H. Color: Selected by Architect, from the manufacturer's standard colors and patterns.

2.5 ACCESSORIES

- A. Provide all accessories for a complete installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fabric, substrates, blocking, and conditions, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of acoustical wall panels.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install acoustical wall panels in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other panels, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
 - 1. Cut units to be at least 50 percent of unit width, with facing material extended over cut edge to match uncut edge. Scribe acoustical wall panels to fit adjacent work. Butt joints tightly.
- B. Comply with acoustical wall panel manufacturer's written instructions for installation of panels using type of concealed mounting accessories indicated or, if not indicated, as recommended by manufacturer. Anchor panels securely to supporting substrate.
- C. Match and level fabric pattern and grain among adjacent panels.
- D. Installation Tolerances: As follows:
 - 1. Variation from Level and Plumb: Plus or minus 1/16 inch.
 - 2. Variation of Panel Joints from Hairline: Not more than 1/16 inch wide.

3.3 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels with fabric facing on completion of installation, to remove dust and other foreign materials according to manufacturer's written instructions, including top edges out of sight

3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer to ensure that acoustical wall panels are without damage or deterioration at time of Substantial Completion.
- B. Replace acoustical wall panels that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion. Do not use attic stock materials for this need.

END OF SECTION 098413

SECTION 099123 – PAINTING AND FINISHING

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. This Section includes surface preparation and the application of paint systems on the following substrates:
 - 1. Steel.
 - 2. Galvanized metal.
 - 3. Wood.
 - 4. Gypsum board.
- B. Related Sections include the following:
 - 1. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.

1.3 SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Submit Stain Samples on representative samples of actual wood substrates, 8 inches square.
 - 5. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
3. VOC content.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Paint/Stain/Varnish: 5 percent, but not less than 1 gal. of each material and/or color applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Apply mockups of each paint system (interior) after permanent lighting, permanent windows, and other environmental services have been activated.
 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily, storage area shall be kept clean and accessible at all times throughout the duration of the painting work.
 3. Comply with health and fire regulations including OSHA 1998.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist or when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Adequate and continuous illumination shall be provided by the contractor in all areas where surface preparation and painting operations are in process. A lighting intensity of 150 foot-candles shall be provided by the contractor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products manufactured by The Sherwin-Williams Company or a comparable product by one of the following:
 - 1. Sherwin-Williams Company.
 - 2. Benjamin Moore & Co.
 - 3. ICI Paints.
 - 4. PPG Architectural Finishes, Inc.
- B. All paints and finishes must be from one single manufacturer. Where thinning is necessary to insure an acceptable finish, use only thinners recommended and manufactured by the paint manufacturer, and use only to the manufacturer's recommended limits.

2.2 PAINT, GENERAL [P]

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated, and these coatings shall maintain their film integrity throughout the entire warranty period.
- B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
 - 1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
 - 2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
 - 3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC content not more than 250 g/L.

4. Floor Coatings: VOC content not more than 100 g/L.
 5. Shellacs, Clear: VOC content not more than 730 g/L.
 6. Shellacs, Pigmented: VOC content not more than 550 g/L.
 7. Flat Topcoat Paints: VOC content of not more than 50 g/L.
 8. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
 9. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
 10. Dry-Fog Coatings: VOC content of not more than 400 g/L.
 11. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.
 12. Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.
- C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 2. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.
- D. Low-Emitting Materials: Interior 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."

- E. Colors: Selected by Architect from manufacturer's full range. Paint schedule as follows:

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Gypsum Board: 12 percent.
 - 5. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.
 - 2. Surface shall be coated as soon as practical after cleaning. In no case shall a cleaned surface be left overnight prior to receiving a base or prime coat.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

2. Remove surface dirt, oil, or grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
 3. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
 4. Countersink steel nails, if used, and fill with putty tinted to final color to eliminate rust leach stains.
- D. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
- E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove surface oxidation.
- J. Wood Substrates:
1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 2. Sand surfaces that will be exposed to view, and dust off.
 3. Prime edges, ends, faces, undersides, and backsides of wood.
 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.3 APPLICATION

- A. Apply paints according to manufacturers written instructions.
1. Use applicators and techniques suited for paint/finish and substrate indicated.
 2. Paint surfaces behind movable items, equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items, equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints/finishes to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
1. Uninsulated metal piping.
 2. Uninsulated plastic piping.
 3. Metal conduit.
 4. Plastic conduit.
 5. Pipe hangers and supports.
 6. Tanks that do not have factory-applied final finishes.
 7. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 8. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 9. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 10. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint/Finish Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 2. Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 3. Testing agency will perform tests for compliance with product requirements.
 4. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.
 5. Contractor shall touch up and restore painted surfaces damaged by testing.
 6. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply

additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 PAINT TYPE AND NUMBER OF COATS

- A. The following painting schedules are intended to identify the type of finishes which are required for the various surfaces, and to identify the surfaces to which each finish is to be applied. Refer to Room Finish Schedule.
- B. To define requirements for quality, function, size, gauges, grades, textures, and color, the following list of materials designates the manufacturer's brands, types, and number of coats required and other requirements that are to be furnished to conform to the requirements of this Project.
- C. Where specific finishes are indicated, it shall specifically refer to the following identified types of coatings.
- D. The primer indicated under Material Identification is intended for the particular substrate surface specified. Where the same finish is scheduled, but for another substrate, provide the proper primer compatible with substrate and the finish.
- E. Where the substrate has a compatible and satisfactory prime coat already on it, the prime coat specified for the numbered finish may be omitted. Test prime coat for compatibility before applying additional coats.

3.7 INTERIOR PAINTING SCHEDULE

- A. Metal - (Exposed Structure - Steel Columns, Steel Joists, Steel Trusses, Steel Beams, Miscellaneous & Ornamental Iron, Structural Iron, Ferrous Metal, etc.)
 - 1. Latex Systems
 - a. Eg-Shel / Satin Finish
 - 1st Coat: S-W Pro Industrial Pro-Cryl® Universal Primer, B66-310 Series
(5-10 mils wet, 2-4 mils dry)
 - 2nd Coat: S-W ProGreen 200 Eg-Shel, B20-650 Series

3rd Coat: S-W ProGreen 200 Eg-Shel, B20-650 Series
(4 mils wet, 1.6 mils dry per coat)

B. Metal – (Exposed Structure including locations where ceiling is not continuous to all walls, steel joists, trusses, beams, metal deck.)

1. Dryfall Waterborne Topcoats

a. Eg-Shel Finish

1st Coat: S-W Pro Industrial Pro-Cryl® Universal Primer, B66-310 Series
(5-10 mils wet, 2-4 mils dry)

2nd Coat: S-W Waterborne Acrylic Dry Fall, B42W2

3rd Coat: S-W Waterborne Acrylic Dry Fall, B42W2
(7-11 mils wet, 3-4.5 mils dry)

C. Metal - (Interior Hollow Metal Frames and Doors)

1. Latex Systems

a. Eg-Shel / Satin Finish

1st Coat: S-W Pro Industrial Pro-Cryl® Universal Primer, B66-310 Series
(5-10 mils wet, 2-4 mils dry)

2nd Coat: S-W Pro Industrial Multi-Surface Acrylic EgShel, B66 Series

3rd Coat: S-W Pro Industrial Multi-Surface Acrylic EgShel, B66 Series

D. Wood - (Doors, Trim, Custom Casework)

1. Stain & Varnish System

a. Satin Finish

1st Coat: S-W Minwax 250 VOC Stains

2nd Coat: S-W WoodClassics Waterborne Polyurethane Varnish, A68 Series

3rd Coat: S-W WoodClassics Waterborne Polyurethane Varnish, A68 Series
(4 mils wet, 1.0 mil dry per coat)

E. Drywall - (Walls)

1. Latex Systems

b. Eg-Shel / Satin Finish

1st Coat: S-W Harmony Low Odor Interior Latex Primer, B11W900
(4 mils wet, 1.3 mils dry per coat)

2nd Coat: S-W Harmony Low Odor Interior Latex Eg-Shel, B9 Series

3rd Coat: S-W Harmony Low Odor Interior Latex Eg-Shel, B9 Series
(4 mils wet, 1.6 mils dry per coat)

- F. Drywall - (Ceilings, Bulkheads and Soffits)
 - 1. Latex Systems
 - c. Flat Finish
 - 1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W02600
(4 mils wet, 1.5 mils dry per coat)
 - 2nd Coat: S-W ProMar 200 Zero VOC Flat, B30-2600
 - 3rd Coat: S-W ProMar 200 Zero VOC Flat, B30-2600
(4 mils wet, 1.8 mils dry per coat)

3.8 EXTERIOR PAINTING SCHEDULE

- A. Metal – Unfinished (Galvanized Steel)
 - 1. Latex Systems
 - a. Satin Finish
 - 1st Coat: S-W A-100® Exterior Latex Satin, A82 Series
 - 2nd Coat: S-W A-100® Exterior Latex Satin, A82 Series
(4 mils wet, 1.4 mils dry per coat)
- B. Metal - (Structural Steel, Ferrous Metal, Misc. Iron, etc.)
 - 1. Latex Systems
 - a. Semi-Gloss Finish
 - 1st Coat: S-W Pro Industrial™ Pro-Cryl Universal Primer, B66-310 Series
(5-10 mils wet, 2-4 mils dry)
 - 2nd Coat: S-W Pro Industrial™ Zero VOC Semi-Gloss Acrylic, B66-650 Series
 - 3rd Coat: S-W Pro Industrial™ Zero VOC Semi-Gloss Acrylic, B66-650 Series
(2.5-4 mils dry per coat)

END OF SECTION 099123

DIVISION

10

SPECIALTIES

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SECTION 101400 - SIGNAGE

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. This Section includes the following:
 - 1. Room-Identification Panel Signs.
 - 2. Dimensional characters.
 - a. Cast metal letters.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for signs.
 - 1. Show sign mounting heights, accessories, typestyles, graphic elements and layout for each sign.
- C. Samples: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:
 - 1. Panel Signs: 8 inches square for each color required.

1.4 QUALITY ASSURANCE

- A. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
- B. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION

- A. Coordinate placement of anchorage devices with templates for installing signs.

PART 2 - PRODUCTS

2.1 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of metal and polymer finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors and sign lamination.
 - 2. Warranty Period: Five years from date of Substantial Completion.

2.2 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.
- B. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).

2.3 PANEL SIGN

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Andco Industries Corp.
 - 2. ASI Sign Systems
 - 3. Best Sign Systems Inc.
 - 4. Diskey Sign Corp.
 - 5. Roban, Inc.
 - 6. Supersine Company (The)
- B. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner, complying with the following requirements:
 - 1. Acrylic Sheet: 1/8 inch thick.
 - 2. Sign Size and Design: Refer to Drawings.
 - 3. Edge Condition: Square cut.
 - 4. Corner Condition: Square.
 - 5. Mounting: Unframed.

- a. Wall mounted with adhesive recommended by manufacturer and nonremovable oval head stainless steel screws.
6. Colors: Match colors as selected by Architect from all “Pantone” colors.
7. Tactile and Braille Sign: Manufacturer's standard process for producing text and symbols complying with ADA-ABA Accessibility Guidelines and with ICC/ANSI A117.1. Text shall be accompanied by Grade 2 Braille. Produce precisely formed characters with square-cut edges free from burrs and cut marks; Braille dots with domed or rounded shape. Raised Thickness: Not less than 1/32 inch.
8. Colored Coatings for Acrylic Sheet: Provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are UV and water resistant for five years for application intended.
9. Text: Each sign shall have a room number and room name.
10. Graphic: All restrooms shall have the international man, woman and handicap symbol.
11. Quantity: 50 signs; 15 ‘RESTROOM’ type signs, 35 ‘OFFICE’ type signs.

2.4 ACCESSORIES

- A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.5 FABRICATION

- A. General: Provide manufacturer's standard signs of configurations indicated.
 1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
 2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
 3. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
 4. Conceal fasteners.

2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of 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 are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

- A. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 - 1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 1.5 mils, medium gloss.

2.8 ACRYLIC SHEET FINISHES

- A. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

2.9 DIMENSIONAL CHARACTERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Basis of Design: ASI Signage; Cast Metal Letters
- B. Cast Characters: Produce characters with smooth flat faces, sharp corners, and precisely formed lines and profiles, free of pits, scale, sand holes, and other defects. Cast lugs into back of characters and tap to receive threaded mounting studs. Alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated. Comply with the following requirements.
- C. Cast Characters: Characters with uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:
 - 1. Character Material: Cast aluminum.
 - 2. Character Height: As indicated on Drawings (6/A4.1).
 - 3. Finishes:
 - a. Integral Metal Finish: Anodized and painted.
 - b. Integral Aluminum Finish: Anodized color as selected by Architect from full range of industry colors and color densities.
 - c. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color as selected by Architect from manufacturer's full range.
 - d. Overcoat: Manufacturer's standard baked-on clear coating.
 - 4. Mounting: Stand off with concealed studs, as recommended by Manufacturer.

- D. Dimensional Character Sign Schedule:
 - 1. Sign Type:
 - a. Sign Size: Letters as shown on Drawings.
 - b. Character Size: Letters as shown on Drawings.
 - c. Text/Message: Letters as shown on Drawings.
 - d. Location: Letters as shown on Drawings.
 - e. Font: Arial.

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 work.
- B. Verify that items, including anchor inserts, are sized and located to accommodate signs.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.
 - 1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
 - 1. Wall mounted with adhesive recommended by manufacturer and nonremovable oval head stainless steel screws.
 - 2. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.
 - 3. Signs Mounted on Glass: Provide matching opaque plate on opposite side of glass to concealed Two-Face Tape mounting materials.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101400

SECTION 101426 - POST AND PANEL SIGNAGE

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. This Section includes the following:
 - 1. Nonilluminated post and panel signs.
- B. Related Sections include the following:
 - 1. Division 01 Section "Temporary Facilities and Controls" for temporary Project identification signs and for temporary informational and directional signs.
 - 2. Division 03 Section "Cast-in-Place Concrete" for concrete foundations and concrete fill.
 - 3. Division 10 Section "Signage" for wall-mounted signs and dimensional characters.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide post and panel signs capable of withstanding the effects of gravity loads and the wind loads and stresses based upon the signage location and all applicable codes and regulations.
- B. Seismic Performance: Provide post and panel signs capable of withstanding the effects of earthquake motions determined according to SEI/ASCE 7, "Minimum Design Loads for Buildings and Other Structures."
- C. Thermal Movements: Provide post and panel signs that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. 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.

1.4 DEFINITIONS

- A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for post and panel signage.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Provide message list, timesteps, graphic elements, and layout for each sign at least half size and full-size details of graphics.
 - 3. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:
 - 1. Aluminum: For each form, finish, and color, on 6-inch- long sections of extrusions and squares of sheet at least 4 by 4 inches.
 - 2. Include a full-size representative sample of surface-applied graphic symbol required in each panel. Show graphic style, colors, finishes, timesteps, and graphic symbol.
 - 3. Frame: 6-inch-- long sections of each profile.
 - 4. Accessories: Manufacturer's full-size unit.
- D. Sign Schedule: Use same designations indicated on Drawings.
- E. Warranty: Special warranty specified in this Section.

1.6 QUALITY ASSURANCE

- A. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
- B. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of signs to be performed according to manufacturers' written instructions and warranty requirements.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of post and panel signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of metal finishes beyond normal weathering.
 - b. Deterioration of graphic image colors and sign lamination.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 5005-H32.
- B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 6063-T5.
- C. Applied Vinyl: Die-cut characters from reflective vinyl film of nominal thickness of 3 mils with pressure-sensitive adhesive backing, suitable for exterior applications.
- D. Color: Selected by Architect from manufacturer's full range.

2.2 POST AND PANEL SIGNS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Andco Industries Corp.
 2. APCO Graphics, Inc.
 3. ASI-Modulex, Inc.
 4. Best Sign Systems Inc.
 5. Supersine Company (The).

2.3 PANEL SIGNS

- A. Sign Message Panels: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.
 1. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.
 2. Increase metal thickness or reinforce with concealed stiffeners or backing materials as needed to produce surfaces without distortion, buckles, warp, or other surface deformations.
 3. Continuously weld joints and seams unless other methods are indicated; grind, fill, and dress welds to produce smooth, flush, exposed surfaces with welds invisible after final finishing.
- B. Hollow-Box-Type Panel Signs: Frame message panel with formed aluminum sheet or extruded hollow-box-type frame with ends flanged to engage slots in posts or attached to posts with

extruded-aluminum fittings. Close top and bottom edges of panels with manufacturer's standard welded seams or extrusions.

1. Message Panel Materials:
 - a. Aluminum Sheet: ¼ -inch thick.
 - 1) Panel Finish: Baked enamel.
 - 2) Color: As selected by Architect from manufacturer's full range.
2. Hollow-Box Depth: Provide panel same depth as posts.
 - a. Corner Condition: Square.
 - b. Finish: Match sign panel face.
 - c. Color: Selected by Architect from manufacturer's full range.
3. Mounting: Around posts.
 - a. Manufacturer's standard noncorroding anchors for substrates encountered.

C. Post and Panel Sign Schedule:

1. Sign Type: Post and panel sign.
 - a. Sign Size: As indicated.
 - b. Message Panel Material: As indicated.
 - c. Post Material: As indicated.
 - d. Character Size: As indicated.
 - e. Text/Message: As indicated.
 - f. Location: As indicated.

2.4 POSTS

- A. General: Fabricate posts to lengths required for mounting method indicated.
 1. Direct-Burial Method: Provide posts 36 inches longer than height of sign to permit direct embedment in concrete foundations.
- B. Aluminum Posts: Manufacturer's standard ¼ -inch- thick, extruded-aluminum tubing, with vertical slots to engage sign panels. Provide stop blocks in slots to hold panels in position. Include post caps, fillers, spacers, junction boxes, access panels, and related accessories required for complete installation.
 1. Square Posts: 2 inches square.
 2. Post Finish: Baked enamel.
 3. Color: Selected by Architect from manufacturer's full range.

2.5 FABRICATION

- A. General: Provide manufacturer's standard post and panel signs of configurations indicated.

1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
3. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of 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 are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

- A. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 1.5 mils, medium gloss.

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 work.
- B. Verify that items are sized and located to accommodate signs.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Excavation: Excavate for sign foundation to elevations and dimensions indicated. Reconstruct subgrade that is not firm, undisturbed, or compacted soil, or that is damaged by freezing temperatures, frost, rain, accumulated water, or construction activities by excavating a further 12 inches, backfilling with satisfactory soil, and compacting to original subgrade elevation.
 - 1. Excavate hole depths approximately 40 inches below finished grade.
- B. Set anchor bolts and other embedded items required for installation of signs. Use templates furnished by suppliers of items to be attached.
 - 1. Protect portion of posts above ground from concrete splatter.
- C. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.
 - 1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101426

SECTION 102226 - OPERABLE PARTITIONS

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. Manually operated, paired acoustical panel partitions.

- B. Related Sections:

- 1. Division 03 Sections for concrete tolerances required.
 - 2. Division 05 Section "Metal Fabrications" for supports that attach supporting tracks to overhead structural system, including pre-punching of support members by structural steel supplier per operable partition supplier's template.
 - 3. Division 06 Sections for wood framing and supports, and all blocking at head and jambs as required.
 - 4. Division 09 Section "Gypsum Board" for applicable sound barrier construction above the ceiling at track.

1.3 DEFINITIONS

- A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."
- B. NIC: Noise Isolation Class.
- C. NRC: Noise Reduction Coefficient.
- D. STC: Sound Transmission Class.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project Site. Both installer and manufacturer's representative attendance required.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For operable panel partitions.
 - 1. Include plans, elevations, sections, attachment details
 - 2. Indicate stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.
 - 3. Include diagrams for power, signal, and control wiring.
- C. Samples: For each type of exposed material, finish, covering, or facing indicated.
 - 1. Panel Facing Material: Manufacturer's standard-size unit, not less than 3 inches square.
 - 2. Panel Edge Material: Not less than 3 inches long.
 - 3. Hardware: Manufacturer's standard exposed door-operating device.
- D. Delegated-Design Submittal: For operable panel partitions.
 - 1. Include design calculations for seismic restraints that brace tracks to structure above.
- E. Coordination Drawings: Reflected ceiling plans, drawn to scale and coordinated with each other, using input from installers of the items involved.
- F. Setting Drawings: For embedded items and cutouts required in other work, including support-beam, mounting-hole template.
- G. Seismic Qualification Certificates: For operable panel partitions, tracks, accessories, and components, from manufacturer.
- H. Product Certificates: For each type of operable panel partition.
- I. Product test reports.
- J. Sample warranty.
- K. Operation and Maintenance Data: For operable panel partitions to include in maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - 1. The panel finish facings and finishes for exposed trim and accessories. Include precautions for cleaning materials and methods that could be detrimental to finishes and performance.
 - 2. Seals, hardware, track, carriers, and other operating components.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of operable panel partition openings by field measurements before fabrication.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of operable panel partitions that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of operable panel partitions.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal wear.
 - 2. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCT MATERIALS

2.1 PERFORMANCE REQUIREMENTS

- A. Operable Acoustical Panels: Operable acoustical panel partition system, including panels, seals finish facing, suspension system, operators and accessories.
 - 1. Basis of Design Project: Subject to compliance with requirements, provide products by Modernfold Inc. "Acousti-Seal Encore Paired Panel System", or a comparable product by one of the following manufacturers.
 - a. Hufcor.
 - b. Panelfold Inc.
- B. Panel Operation:
 - 1. Manually operated, paired panels: Acousti-seal "Encore"
 - 2. Panel Construction: Provide top reinforcement as required to support panel from suspension components and provide reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities. Steel Frame: Steel sheet, manufacturer's standard nominal minimum thickness for uncoated steel.

3. Steel Face/Liner Sheets: Tension-levleed steel sheet, manufacturer's standard nominal minimum thickness for uncoated steel.
- C. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
 - D. STC: Not less than 56.
 - E. Panel Closure: Manufacturer's standard.
 - F. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.
 2. Color: To be of one consistent color as selected by Architect from manufacturer's full standard range.

2.2 SEALS

- A. General: Provide types of seals indicated that produce operable panel partitions complying with acoustical performance requirements and the following:
 1. Manufacturer's standard seals.
 3. Seals made from materials and in profiles that minimize sound leakage.
 4. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.
- B. Vertical Interlocking Sound Seals between panels: Roll-formed steel astragals, with tongue and groove configuration in each panel edge. Rigid plastic or aluminum astragals are not acceptable.
- C. Horizontal Top Seals: Modernfold "SureSet" automatic operable top seals, manually operated operable top seals not required or permitted.
- D. Horizontal Bottom Seals: Modernfold "SureSet" automatic operable top seals, manually operated operable top seals not required or permitted.
 1. Automatically Operated for Acoustical Panels: Extension and retraction of bottom seal automatically operated by movement of partition, with operating range not less than 1 inches between retracted seal and floor finish.

2.3 FINISH FACING

- A. General: Provide finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant nonstaining adhesive as recommended by facing manufacturer's written instructions. Vinyl-Coated Fabric Wall Covering over Tackable Cork Substrate: Manufacturer's standard, self-healing, mildew-resistant, washable, vinyl-coated fabric wall covering; complying with CFFA-W-101-D, Type II; Class A.
 - 1. Color and pattern: as selected by Architect from manufacturer's full standard range.
- B. Cap-Trimmed Edges: Protective perimeter-edge trim with tight hairline joints concealing edges of panel and finish facing, finished as follows:
 - 1. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper required to comply with performance requirements; and with manufacturer's standard clear anodic finish.
- C. Trimless Edges: Fabricate exposed panel edges so finish facing wraps uninterrupted around panel, covering edge and resulting in an installed partition with facing visible on vertical panel edges, without trim, for minimal sightlines at panel-to-panel joints.

2.4 SUSPENSION SYSTEMS

- A. Suspension Tracks: #17 – Smart track roll-formed steel track with adjustable steel hanger rods for overhead support, designed for type of operation, size, and weight of operable panel partition indicated. Aluminum track is not acceptable. Size track to support partition operation and storage without damage to suspension system, operable panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.
 - 1. Panel Guide: Aluminum; finished with manufacturer's standard clear anodic finish.
 - 2. Head Closure Trim: As required for acoustical performance; with factory-applied, decorative, protective finish.
- B. Carriers: All steel trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.
- C. Aluminum Finish: Manufacturer's standard clear anodic finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable panel partitions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with ASTM E557 except as otherwise required by operable panel partition manufacturer's written installation instructions.
- B. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed.
- C. Install panels from marked packages in numbered sequence indicated on Shop Drawings.
- D. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.
- E. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.
- F. Light-Leakage Test: Illuminate one side of partition installation and observe vertical joints and top and bottom seals for voids. Adjust partitions for alignment and full closure of vertical joints and full closure along top and bottom seals.

3.3 ADJUSTING

- A. Adjust operable panel partitions to operate smoothly, without warping or binding. Lubricate hardware and other moving parts.
- B. Verify that safety devices are properly functioning.

3.4 FIELD QUALITY CONTROL

- A. Light-Leakage Test: Illuminate one side of partition installation and observe vertical joints and top and bottom seals for voids; adjust partitions for acceptable fit.
- B. NIC Testing: Owner will engage a qualified testing agency to perform tests and inspections.
- C. Testing Methodology: Perform testing of installed operable panel partition for noise isolation according to ASTM E 336, determined by ASTM E 413, and rated for not less than NIC indicated. Adjust and fit partitions to comply with NIC test method requirements.

- D. Testing Extent: Testing agency shall randomly select one operable panel partition installation for testing.
- E. Repair or replace operable panel partitions that do not comply with requirements.
- F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of repaired, replaced, or additional work with specified requirements.
- G. Prepare test and inspection reports.

3.5 CLEANING

- A. Clean soiled surfaces of operable panel partitions to remove dust, loose fibers, fingerprints, adhesives, and other foreign materials according to manufacturer's written instructions.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.

END OF SECTION 102226

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SECTION 102600 - WALL AND DOOR PROTECTION

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

Section Includes:

- 1. Corner guards.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for steel angle corner guards.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
- 2. Include fire ratings of units recessed in fire-rated walls and listings for door-protection items attached to fire-rated doors.

- B. Shop Drawings: For each type of wall and door protection showing locations and extent.

- 1. Include plans, elevations, sections, and attachment details.

- C. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.

- 1. Include Samples of accent strips and accessories to verify color selection.

- D. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type of exposed plastic material.

- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.
 - 1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than two, 48-inch- (1200-mm-) long units.
 - 2. Mounting and Accessory Components: Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 - 1. Maintain room temperature within storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored.
 - 2. Keep plastic materials out of direct sunlight.
 - 3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F (21 deg C).
 - a. Store corner-guard covers in a vertical position.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
 - b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
 - 2. Warranty Period: Five years from date of Substantial Completion, minimum.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall protection products from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.

2.3 CORNER GUARDS

- A. Surface-Mounted, Corner Guards to be determined: Manufacturer's standard, assembly consisting of cover installed over retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition. Refer to drawings for all locations.
- B. Manufacturers:
 - 1. Inpro 130 Corner Guard; or approved equal.
 - 2. Finish: As selected by Architect from manufacturer's full range of standard colors.
- C. Size: 4 feet high by 3 inch wing; continuous BluNose retainer mounted directly to wall.
- D. Accessories: provide top caps.

2.4 MATERIALS

- A. Vinyl Materials: Chemical- and stain-resistant, high-impact-resistant vinyl with integral color throughout; extruded and sheet material as required, thickness as indicated.
- B. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- C. Adhesive: As recommended by protection product manufacturer.

2.5 FABRICATION

- A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.

- B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.6 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances, fire rating, and other conditions affecting performance of the Work.
- B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
 - 1. For wall and door protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and door protection.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install wall and door protection in locations and indicated on Drawings. Mount directly above the wall base.

- C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
 - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
 - 2. Where splices occur in horizontal runs of more than 20 feet (6.1 m), splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches (305 mm) apart.
 - 3. Adjust end and top caps as required to ensure tight seams.

3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

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SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

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. This Section includes the following:
 - 1. Public-use washroom, private-use washroom, shower room, and custodial accessories.
- B. Related Sections include the following:
 - 1. Division 22 Sections for shower units for work associated with shower curtains.
 - 2. Division 26 Sections for wiring and other electrical work associated with electric hand dryers.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Construction details and dimensions.
 - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Material and finish descriptions.
 - 4. Features that will be included for Project.
 - 5. Manufacturer's warranty.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify products using designations indicated on Drawings.
- C. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.
- D. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch minimum nominal thickness, unless otherwise indicated.
- B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch minimum nominal thickness.
- D. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 PUBLIC-USE WASHROOM, PRIVATE-USE WASHROOM, SHOWER ROOM, AND CUSTODIAL ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. A & J Washroom Accessories, Inc.
2. American Accessories, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.

B. Toilet Tissue Dispenser **(RH)**:

1. Basis of Design: Bradley Corp. Model 5235
2. Description: Surface mounted stainless steel dual roll toilet tissue dispenser.
3. Material: 304 stainless steel with satin finish, chrome-plated spindle
4. Lock: None.
5. Dispenses: Two 5-1/2 inch diameter rolls.
6. Spindle: Concealed spring, free, non-controlled delivery.

C. Grab Bar **(GB-18")**:

1. Description: Stainless Steel Type: Provide grab bars with wall thickness not less than 0.05-inch and as follows:
2. Mounting: Concealed, manufacturer's standard flanges and anchorages.
3. Clearance: 1-1/2-inch clearance between wall surface and inside face of bar.
4. Gripping Surfaces:
 - a. Smooth, satin finish, unless noted otherwise.
 - b. Manufacturer's standard nonslip texture in wet areas.
5. Heavy Duty Size: Outside diameter or 1-1/4 inches minimum.
6. Configuration and Length:
 - a. 18-inch straight.

D. Grab Bar **(GB-36")**:

1. Description: Stainless Steel Type: Provide grab bars with wall thickness not less than 0.05-inch and as follows:
2. Mounting: Concealed, manufacturer's standard flanges and anchorages.
3. Clearance: 1-1/2-inch clearance between wall surface and inside face of bar.
4. Gripping Surfaces:
 - a. Smooth, satin finish, unless noted otherwise.
 - b. Manufacturer's standard nonslip texture in wet areas.
5. Heavy Duty Size: Outside diameter or 1-1/4 inches minimum.
6. Configuration and Length:
 - a. 36-inch straight.

E. Grab Bar **(GB-42")**:

1. Description: Stainless Steel Type: Provide grab bars with wall thickness not less than 0.05-inch and as follows:
2. Mounting: Manufacturer's standard flanges and anchorages.

3. Clearance: 1-1/2-inch clearance between wall surface and inside face of bar.
 4. Gripping Surfaces:
 - a. Smooth, satin finish, unless noted otherwise.
 - b. Manufacturer's standard nonslip texture in wet areas.
 5. Heavy Duty Size: Outside diameter or 1-1/4 inches minimum.
 6. Configuration and Length:
 - a. 42-inch straight.
- F. Glass Mirror w/ Frame (**M 30" x 42"**):
1. Frame: 18 gauge stainless steel.
 2. Mirror: Tempered glass mirror.
 3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
 - a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
 4. Size: 30-inches wide by 42-inches high.
- G. Mop and Broom Holder (**MH**):
1. Description: Unit with shelf, hooks and holders suspended beneath shelf.
 2. Location: Refer to drawings.
 3. Length: 36 inches.
 4. Hooks: Three.
 5. Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
 6. Material and Finish: Stainless steel, No. 4 finish (satin).
 7. Shelf: Not less than nominal 0.05-inch- thick stainless steel.
- H. Paper Towel Dispensers (**TD**):
1. Basis of Design: Bradley Corp. Model 2494
 2. Description: Surface-mounted with sensor activation
 3. Location: Refer to drawings.
 4. Material: High-impact plastic.
 5. Lock: Key activated spring lock.
 6. Dispenses: Roll towels up to 8" in diameter and 8" wide, or 3" diameter stub roll.
- I. Coat Hook (**CH**):
1. Basis of Design: Bradley Corp. Model 9-114
 2. Description: Surface-mounted, concealed mounting.
 3. Location: Refer to drawings.
 4. Size: Projects 2-inches.
 5. Mounting: Manufacturer's standard flanges and anchorages.
 6. Material: 304 stainless steel with satin finish.
- J. Baby Changing Station (**BCS**):
1. Basis of Design: Bradley Corp. Model 962
 2. Description: Surface mounted stainless steel.
 3. Location: Refer to drawings.

4. Material: Bacterial-resistant polyethylene with brushed 20 gauge stainless steel.
5. Operation: Pneumatic gas shock.

2.3 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 102800

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SECTION 104413 - FIRE EXTINGUISHERS AND CABINETS

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. Portable, hand-carried fire extinguishers.
 - 2. Mounting brackets for fire extinguishers.
 - 3. Fire protection cabinets for portable fire extinguishers.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguishers and mounting brackets.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.4 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
- C. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.
- D. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- E. Coordinate sizes and locations of fire protection cabinets with wall depths.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- B. Stainless-Steel Sheet: ASTM A 666, Type 304.
- C. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products from one of the following:
 - 1. J. L. Industries, Inc.; a division of Activar Construction Products Group.
 - 2. Larsen's Manufacturing Company.
 - 3. Potter Roemer LLC.

2.3 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.
 - 1. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.
- B. Wet chemical Type: UL-rated K (2-A:1-B:C:K), 2.5 gallon (9.5-L), nominal capacity, with solutions of potassium acetate, potassium carbonate, potassium citrate, or combinations of all these materials, in manufacturer's standard stainless steel container. Use in Food Service Facilities.
- C. Multipurpose Dry-Chemical Type: UL-rated 2-A:10:B:C, 5-lb (2.3-kg) nominal capacity, in enameled-steel container. Use in all locations except Food Service Facilities.

2.4 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

2.5 FIRE PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
- B. Cabinet Construction: Nonrated.
- C. Cabinet Material: Steel sheet.
- D. Semirecessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
 - 1. Trim:
 - a. Square-Edge Trim: 1-1/4 to 1-1/2 inch backbend depth.
 - b. Rolled-Edge Trim: 4-inch backbend depth.
- E. Cabinet Trim Material: Stainless-steel sheet.
- F. Door Material: Stainless-steel sheet.
- G. Door Style:
 - 1. Fully glazed panel with frame; all other locations.
 - a. Tempered float glass (clear).
- H. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
- I. Accessories:
 - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 - 2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as required by authorities having jurisdiction.

- a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet glazing (at fully glazed panels).
 - a) Apply to opaque panel (at solid opaque panels).
 - 2) Application Process: Pressure-sensitive vinyl letters to back side of glass, (at fully glazed panels).
 - a) Apply to opaque panel surface (at solid opaque panels).
 - 3) Lettering Color: Red.
 - 4) Orientation: Vertical.

J. Finishes:

1. Exterior of cabinet, door, and trim: Stainless Steel No. 4.
2. Interior of cabinet and door: Manufacturer's baked enamel paint, color selected by Architect.

2.6 FABRICATION

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Miter and weld joints and grind smooth.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine fire extinguishers for proper charging and tagging.
 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.
 - a. Fasten mounting brackets to surfaces, square and plumb, at locations indicated.
- C. Examine walls and partitions for suitable framing depth and blocking where cabinets will be installed, and prepare recesses required by type and size of cabinet and trim style.
- D. Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- E. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

- F. Identification: Apply vinyl lettering at locations indicated.
- G. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- H. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

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FURNISHINGS

DIVISION

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SECTION 122413 - ROLLER WINDOW SHADES

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. Manually operated roller shades with single rollers.

1.3 SUBMITTALS

- A. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.
- B. Samples for Initial Selection: For each colored component of each type of shade indicated.
 - 1. Include similar Samples of accessories involving color selection.
- C. Samples for Verification:
 - 1. Shade Material: Not less than 3 inches square, with specified treatments applied. Mark face of material.
- D. Quality Assurance/Control Submittals:
 - 1. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
- E. Closeout Submittals:
 - 1. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
 - a. Methods for maintaining roller shades and finishes.
 - b. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
 - c. Operating hardware.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response 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:
 - 1. Flame-Resistance Ratings: Passes NFPA 701.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Product Standard: Provide roller shades complying with WCMA A 100.1.
- D. Safety Standards: To meet or exceed ANSI/WCMA A 100.1-202 compliance.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory packages, marked with manufacturer and product name, fire-test-response characteristics, lead-free designation, and location of installation using same designations indicated on Drawings.
- B. Waste Management and Disposal: As specified in Division 01 Section "Construction Waste Management and Disposal" and as follows:
 - 1. Coordinate with manufacturer for take-back program. Set aside scrap and packaging to be returned to manufacturer for recycling into new product.
 - 2. Separate corrugated cardboard and packaging accordance with Waste Management Plan and place in designated areas for recycling.
 - 3. Fold up metal banding, flatten, and place in designated area for recycling.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operating hardware throughout the entire operating range. Notify A/E of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Manual Shades
 - a. Draper Sunshades; or approved equal.
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for A/E's approval must be accompanied by the "Substitution Request Form" and complete technical data for evaluation. All materials for evaluation must be received by the Project Manager and Specification Department at least ten days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Bead Chains: Stainless steel.
 - a. Loop Length: Full length of roller shade.
 - b. Limit Stops: Provide upper and lower ball stops.
 - c. Chain-Retainer Type: Chain tensioner, jamb mounted unless otherwise noted.
 - d. Bead Chain Hold Down: P-Clip.
- B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shade bands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shade bands for service.
 - 1. Single Roller Configuration.
 - 2. Roller Drive-End Location: Right side of inside face of shade, unless otherwise noted.
 - 3. Direction of Shadeband Roll: Regular, from back of roller.
 - 4. Shade band-to-Roller Attachment: Removable spline fitting integral channel in tube.
- C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
 - 1. Hardware size: Small.
- D. Mounting: Fascia end caps, fabricated from steel finished to match fascia or headbox.
 - 1. Inside mounting permitting easy removal and replacement without damaging roller shade or adjacent surfaces and finishes.
- E. Fascia: L-shaped, formed-steel sheet or extruded aluminum; long edges returned or rolled; continuous panel concealing front and bottom of shade roller, brackets, and operating hardware and operators; length as required to conceal shade and operating mechanisms;

removable design for access.

1. Color to be selected by Architect from manufacturer's full range of standard colors.
- F. Bottom Bar: Steel or extruded aluminum, with plastic or metal capped ends. Provide concealed, by pocket of shade material, internal-type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.
- G. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- H. Shade bands:
1. Shade band Material: Light-filtering fabric.
 2. Shade band Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Manufacturer's standard.
 - b. Color and Finish: White, as selected by Architect from manufacturer's full range of standard colors.

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
1. ShadeBand Material and Color: Sheer Weave, 5% openness. Color to be selected by Architect from manufacturer's full range of standard colors.

2.4 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.01, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg. F.
1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
 2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:
1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater

than 1:3, provide battens and seams at uniform spacing along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion or sag of material.

2. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shade band.
- D. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting fascia, roller, and operating hardware, and for hardware position and shade-mounting method indicated.
- E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.
- F. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.
- G. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range of standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.
- B. Install side channels, if required, in strict accordance with the manufacturer's written instructions and shop drawings.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Contract Completion.

- C. Replace damaged roller shades that cannot be repaired, in a manner approved by A/E, before time of Contract Completion.

END OF SECTION 122413

SECTION 123240 - CASEWORK

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 the following:

- 1. Plastic-laminate casework.
- 2. Plastic-laminate countertops.

- B. Related Sections include the following:

- 1. Section 061000 "Rough Carpentry" for wood blocking for anchoring casework and solid surface materials.
- 2. Section 096513 "Resilient Wall Base and Accessories" for resilient base applied to casework.
- 3. Divisions 22 and 26 Sections for installing service fittings specified in this Section, including connecting service utilities.

1.3 DEFINITIONS

- A. Exposed Surfaces of Cabinets: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches above floor, and surfaces visible in open cabinets.
- B. Semiexposed Surfaces of Cabinets: Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors. Tops of cases 78 inches or more above floor are defined as semiexposed.
- C. Concealed Surfaces of Cabinets: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, and ends and backs that are placed directly against and completely concealed by walls or other cabinets.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for educational casework. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Indicate locations of blocking and reinforcements required for installation.
 - 2. Indicate locations of clearances from adjacent walls, doors, windows, other building components and other equipment.

- C. Samples for Verification: 6-inch square samples for each type of finish, including top material.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Provide manufactured casework system, countertops and related items furnished by one supplier from a single manufacturer. Manufacturer shall show evidence of a minim of five (5) years experience in providing manufactured casework systems for similar types of projects.
 - 1. Obtain countertops, sinks, accessories, and service fittings from casework manufacturer.
- B. Quality Standard: Manufactured casework systems must conform to design, quality of material, workmanship and function as shown on drawings and specified herein. Minimum quality standards for cabinets shall be in accordance with A.W.I. Section 1600B, latest edition. Minimum quality standards for high-pressure decorative laminate countertops shall be in accordance with A.W.I. Section 400C, latest edition, Custom grade. Additional requirements follow herein.
- C. Product Designations: Where specific materials, finishes, construction details, and hardware are specified herein, the contractor shall be held in strict accordance. All items shall be as provided and publicly cataloged, by one manufacturer to assure physical and dimensional integrity of the system and ready access to additional systems components for a minimum of ten (10) years after final completion.
- D. Within thirty (30) days after Contract award, the casework contractor shall identify any requirements for plumbing, mechanical, electrical, or data connections necessary for the use or operation of specific equipment items listed in the equipment schedule. Review the locations of connections and outlets shown on applicable plumbing, mechanical, and electrical drawings and notify the Architect in writing of additional connections or relocations necessary for the proper installation of the casework contractor's equipment. After the thirty (30) day period, the casework contractor shall be responsible for the cost of supplying or relocating plumbing, mechanical, electrical, or data connections attributable to specific equipment requirements.
- E. Keying Conference: Conduct conference at Project site. Incorporate keying conference decisions into final keying requirements.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements I n Division 01 Section "Project Management and Coordination".

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.7 PREPARATION

- A. Environmental Limitations: Do not deliver or install educational casework until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

- B. Conditioning period begins not less than seven days before casework installation, is continuous through installation, and continues not less than seven days after casework installation.
- C. Environmental Conditioning: Maintain an ambient temperature between 65 and 75 deg F and relative humidity planned for building occupants in spaces to receive casework during the conditioning period.
- D. Casework Conditioning: Move casework into spaces where it will be installed, no later than the beginning of the conditioning period.
 - 1. Do not install casework until it adjusts to relative humidity of, and is at same temperature as, space where it is to be installed.
 - 2. Open sealed packages to allow casework to acclimatize immediately on moving casework into spaces in which it will be installed.
- E. After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.
- F. Field Measurements: Where educational casework is indicated to fit to other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating institutional casework without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

- A. Coordinate layout and installation of metal framing, wood blocking, and reinforcements in gypsum board assemblies for support of educational casework.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of educational casework that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Delamination of components or other failures of glue bond.
 - 2. Warping of components.
 - 3. Failure of operating hardware.
 - 4. Deterioration of finishes.
- B. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Casework:

1. Stevens Cabinet Company catalog numbers have been shown in schedules for convenience in identifying casework. Unless modified by notation on drawings or otherwise specified, the catalog description for the indicated number constitutes the requirement for each cabinet. The use of catalog numbers and specific requirements set forth in drawings and specifications, are not intended to preclude the use of any other acceptable manufacturer's product or procedures which may be equivalent, but are given for the purpose of establishing quality for materials, construction and workmanship.
 2. Basis-of-Design Product: Subject to compliance with requirements, provide products by the Stevens Cabinet Company or a comparable product by one of the following:
 - a. Case Systems, Inc.
 - b. LSI Corporation of America, Inc.
 - c. TMI Systems Design Corp.
 - d. Case Distribution, Inc.
- B. Plastic Laminate:
1. Plastic-Laminate Material:
 - a. Wilsonart International, Inc.
 - b. Formica Corporation
 - c. Nevamar Company, LLC.
 - d. Pionite – Panolam Surface Systems.
- 2.2 MATERIALS, GENERAL:
- A. Low-Emitting Materials: Provide manufactured wood casework, including countertops, made with adhesives and composite wood products containing no urea formaldehyde.
 - B. Particleboard: ANSI A208.1, Grade M-2.
 1. Recycled Content: Not less than 10 percent preconsumer recycled content.
 - C. Medium-Density Fiberboard: ANSI A208.2, Grade 130.
 1. Recycled Content: Not less than 10 percent preconsumer recycled content.
 - D. Hardboard: AHA A135.4, Class 1 Tempered.
 1. Recycled Content: Not less than 10 percent preconsumer recycled content.
 - E. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
 - F. Surface Materials and Laminate Color Selection: 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. Compliance with other specified requirements is the exclusive responsibility of the Contractor.
 1. Exposed vertical surfaces and panel ends: high pressure decorative plastic laminate meeting or exceeding NEMA GP28. Color as selected by Architect from manufacturer's full range.

2. Semi-exposed surfaces: high pressure plastic laminate cabinet liner meeting or exceeding NEMA CL-20 or thermofused melamine laminate. Color as selected by Architect from manufacturer's full range.
3. Concealed surfaces: high pressure plastic laminate cabinet liner meeting or exceeding NEMA CL-20. Color as selected by Architect from manufacturer's full range.
4. Door/Drawer Fronts (exterior face of any laminate hinged or sliding door and drawer fronts): high pressure decorative laminate meeting or exceeding NEMA GP-28. Interior surfaces of doors and drawers fronts to be balanced with high pressure plastic laminate cabinet liner meeting or exceeding NEMA CL-20. GP-28 laminate color as selected by Architect from full range of Wilsonart, Nevamar, Formica, or Pionite color groups. CL-20 color as selected by Architect from casework manufacturer's full range.
5. Horizontal Work Surfaces (countertops identified on drawings as plastic laminate and related splashes, curbs, caps and closures); high pressure decorative plastic laminate meeting or exceeding NEMA GP50 balanced with backing sheet on underside. Color as selected by Architect from manufacturer's full range.

G. Edging Materials and Colors:

1. Finish all exposed edges of cabinet members (including wall cabinet top and bottom, front and back edges of shelves) with a 1mm thick chip and crack resistant rigid PVC extrusion, through color with satin finish and UV cured top coat for additional durability. Edging to be machine applied with waterproof hot melt adhesive. PVC edging color selected by Architect from manufacturer's full range.
2. Exposed edges of Door and Drawer Fronts, Back and End Splashes, and Countertops: Edge with 3mm thick chip and crack resistant rigid PVC extrusion, through color with satin finish with UV cured top coat for additional durability. Machine apply edging with waterproof hot melt adhesive. PVC edging color selected by Architect from manufacturer's full range.

2.3 CONSTRUCTION

A. Fabricate casework to dimensions, profiles, and details shown.

B. Cabinet Body:

1. Integral cabinet components shall be joined with dowel pins. Cabinets shall be assembled under controlled case clamp conditions assuring final cabinet squareness and proper joint compressions. All dowel pin joints shall employ 8mm diameter, fluted hardwood dowel pins.
2. Cabinet ends shall be 3/4" thick particleboard panels of balanced construction and precision bored for dowel pins installed in horizontal cabinet members. Base and tall units shall have one piece end panels continuous to floor for added load capabilities. Unexposed ends shall have laminate backing sheet.
3. Bottoms and tops of base and tall units shall be 3/4" thick particleboard panels of balanced construction. Base cabinets shall include a full depth 3/4" thick top panel. Panels shall be precision bored to receive fluted dowel pins, which shall be inserted with glue. Dowel pins shall extend from the panel ends for joining into mating hole patterns of cabinet ends.
4. Bottom and tops of wall cabinets shall be full 1" thick particleboard panels of balanced construction. These panels must feature the same fluted dowel pin and glue joint construction as the base and tall cabinets.

5. Two (2) toe kick support rails shall be inset from cabinet front and back edges and doweled into cabinet ends. This integral twin rail construction shall be part of all base and tall cabinet structures for additional load support.
6. Back panels shall be 1/4" thick tempered hardboard or 3/8" thick particleboard panels and inset 3/4" from rear vertical edge of cabinet. Finished exposed backs and fixed cabinets shall be 3/4" thick particleboard panels of balanced construction surfaced as described in this section.
7. Mounting rails shall be fully concealed behind backs. Rails shall be 3/4" thick and fastened to cabinet ends with dowel pin joints. Wall and tall cabinet shall incorporate two mounting rails. Wall cabinets shall have rails positioned at top and bottom. Tall cabinets shall have rails positioned at top and intermediate location. Base units shall have rail positioned in the upper back area.

C. Door and Drawer Fronts:

1. Core for all doors and applied drawer fronts shall be 3/4" thick particleboard. All edges shall be finished as indicated herein.
2. All door and drawer fronts shall be flush-overlay construction.

D. Drawers:

1. Drawers shall be full box design with a separate front. Drawer sides and ends shall be constructed of 5/8" thick medium density fiberboard or 1/2" thick particleboard in melamine laminate and matching PVC top edges in color as selected by Architect from manufacturer's full range of colors. Bottoms shall be 1/4" thick medium density fiberboard or 1/2" thick particleboard with matching melamine laminate fencing.
2. Corner joints shall be interlocking dowel pins design. 8mm hardwood dowel pins shall be inserted into drawer ends and shall fit into matching hole patterns in drawer sides. Bottom shall be trapped in grooves on all four sides (1/4" thick medium density fiberboard) or screwed directed to the bottom edges of the drawer box (1/2" thick particleboard). Joints shall be glued and bottom shall have additional mechanical fasteners. Drawers shall be suspended on slides as described in this section.

E. Shelves

1. All adjustable and fixed shelves shall be 3/4-inch thick minimum.

F. Frame Rails:

1. Frame rails between drawers shall be full length, 3/4-inch thick x 3-1/2 inches wide, and shall be fastened to cabinet ends with dowel pins.

G. Plastic Laminate Countertops and Backsplashes

1. Countertops at wet areas shall be constructed of a 1" phenolic-resin particleboard core with 90 degree square front edge. Countertops at all other areas shall be constructed of a 1" particleboard core with 90 degree square front edge. Top edge of separate backsplash to have 90 degree square profile on upper edge. Countertops shall have dowels and wafers for alignment and tight joint fasteners at all joints. All exposed edges of Countertops, Backsplashes, and Endsplashes to have 3mm PVC edge.

2.4 CABINET HARDWARE

A. Hinges:

1. Shall be five-knuckle institutional grade, 2-3/4" overlay type with hospital tip and shall permit 270 degree door swing. Hinge attachment to sides of cabinet shall employ special 5mm threaded fasteners for additional strength. Hinge shall have a lifetime guarantee warranted by the hinge manufacturer. Doors less than 48" in height shall have two (2) hinges on each door; doors 48" and taller in height shall have three (3) hinges on each door. Hinges shall be available in brushed chrome and epoxy powder coated finish. Epoxy powder coated finish colors shall be coordinated with solid color PVC selections.

B. Door Catches/Bumper Strike Plate:

1. Each door shall be provide with a heavy-duct spring loaded, large diameter (17.5mm-11/16") roller type catch mounted at bottom edge to maintain and support proper door alignment. All doors over 48" in height shall be provided with roller catch at both top and bottom of door.
2. Catch strike plate shall be injection molded nylon, with an integrally molded engagement ridge. Strike plate shall also provide a wide face bumper insuring a positive door stop.

C. Drawer/Door Pulls:

1. Pulls shall be available in brushed metal finishes and epoxy powder coated finishes, bent wire style. Pull finish color to be selected by Architect from manufacturer's full range.

D. Door Slides:

1. Drawers and slide out shelves shall be suspended on nylon roller, pearl epoxy coated steel slides to insure smooth, quiet operation. Slides shall have 100 pound load rating at full extension and shall have a built-in drawer top and self-close feature in the last 1" of travel.
2. Drawers specifically noted for file and box drawer use shall be suspended on plated steel full-extension ball bearing slides having a load rating of 150 pounds at full extension.
3. Kneespace and pencil drawers shall be designed to permit undercounter or support frame mounting.

E. Adjustable Shelf Support System:

1. Shelf supports for adjustable shelves shall be injection molded nylon, clear in color to coordinate with selected interior finish. Shelf support shall incorporate integrally molded lock tabs accommodating 1" thick shelves to prevent shelf from tipping and inadvertent lift out. Each support shall have 5mm dia. double pin engagement into precision bored hole pattern in cabinet vertical members. Shelves are adjustable on 32mm (1-1/4") centers. Supports shall have molded ridge exerting pressure against edge of shelving to maintain positive pin engagement. Supports designed to permit field fixing of shelf is desired. Static load test load to exceed 200 pounds per support.

F. Locks:

1. Locks shall be diecast body with dead bolt engagement tang, 6-Tumbler mechanism. Each lock shall be provided with two (2) milled brass keys. Provide locks AT EACH DRAWER AND CABINET DOOR UNLESS NOTED OTHERWISE. Key each room differently. Provide master keying for all locks.
2. All keys for each room shall be taped inside one drawer of a cabinet unit within the room in which the keys are intended for use. All required keys shall be inside this selected drawer at the date of contract completion and will be checked as part of the punch-list. This drawer and all other drawers shall be locked at contract completion.
3. Casework Manufacturer shall supply the Owner with a Key cabinet of adequate size and configuration to store all casework keys in an organized method. Location to be determined by the Owner at project completion.
4. Chain bolts shall be provided on inactive door on locking cabinets 72-inches or greater in height.

H. File Suspension Rails:

1. All file drawers shall be provided with an integral file suspension rail system. File drawers shall be capable of accepting legal size file hangers in a lateral attitude if so desired.

J. Chainstops:

1. Provide chainstops at each cabinet door where adjacent construction prohibits door from swinging the full 270 degrees.

K. Grommets:

1. Provide PVC round grommet and cover with 2-1/2" diameter opening at all open countertops at 3 foot spacing and where indicated on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of casework.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CABINETS

- A. Comply with installation requirements in SEFA 2.3. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical. Do not exceed the following tolerances
 1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet.
 2. Variation of Bottoms of Upper Cabinets from Level: 1/8 inch in 10 feet.
 3. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet.
 4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch.

5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch.
- B. Utility-Space Framing: Secure to floor with two fasteners at each frame. Fasten to partition framing, wood blocking, or metal reinforcements in partitions and to base cabinets.
- C. Base Cabinets: Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced not more than 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.
 1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24 inches o.c. and at sides of cabinets with not less than 2 fasteners per side.
- D. Wall Cabinets: Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 24 inches o.c.
- E. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
- F. Adjust casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF COUNTERTOPS

- A. Comply with installation requirements in SEFA 2.3. Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only where shown on Shop Drawings.
- B. Field Jointing: Where possible, make in same manner as shop-made joints using dowels, splines, fasteners, adhesives, and sealants recommended by manufacturer. Prepare edges in shop for field-made joints.
 1. Use concealed clamping devices for field-made joints in countertops. Locate clamping devices within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a uniform heavy pressure at joints.
- C. Fastening:
 1. Secure countertops, except for epoxy countertops, to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.
 2. Secure epoxy countertops to cabinets with epoxy cement, applied at each corner and along perimeter edges at not more than 48 inches o.c.
 3. Where necessary to penetrate countertops with fasteners, countersink heads approximately 1/8 inch and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.
- D. Provide required holes and cutouts for service fittings.

- E. Provide scribe moldings for closures at junctures of countertop, curb, and splash with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent casework.
- F. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.4 CASEWORK SEALANT

- A. Use chemical-resistant, paintable, permanently elastic sealant recommended by manufacturer and specified in Division 07 Section “Joint Sealants” at the following locations:
 - 1. Joints between backsplashes/endspashes and countertop.
 - 2. Joints between fillers and walls, or any other spaces adjacent to walls as required.
 - a. Sealant adjacent to walls shall be carefully painted to match the adjacent wall color.

- B. Sealant Color: clear.

3.5 INSTALLATION OF SINKS

- A. Comply with installation requirements in SEFA 2.3.

3.6 CLEANING AND PROTECTING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- B. Advise all contractors of procedures and precautions to protect casework and countertops from damage by other trades until acceptance of work by Owner.
- C. Cover casework with 6-mil polyethylene film for protection against soiling and deterioration during remainder of construction period. Tape to underside of countertop at a minimum of 48 inches o.c.

END OF SECTION 123240