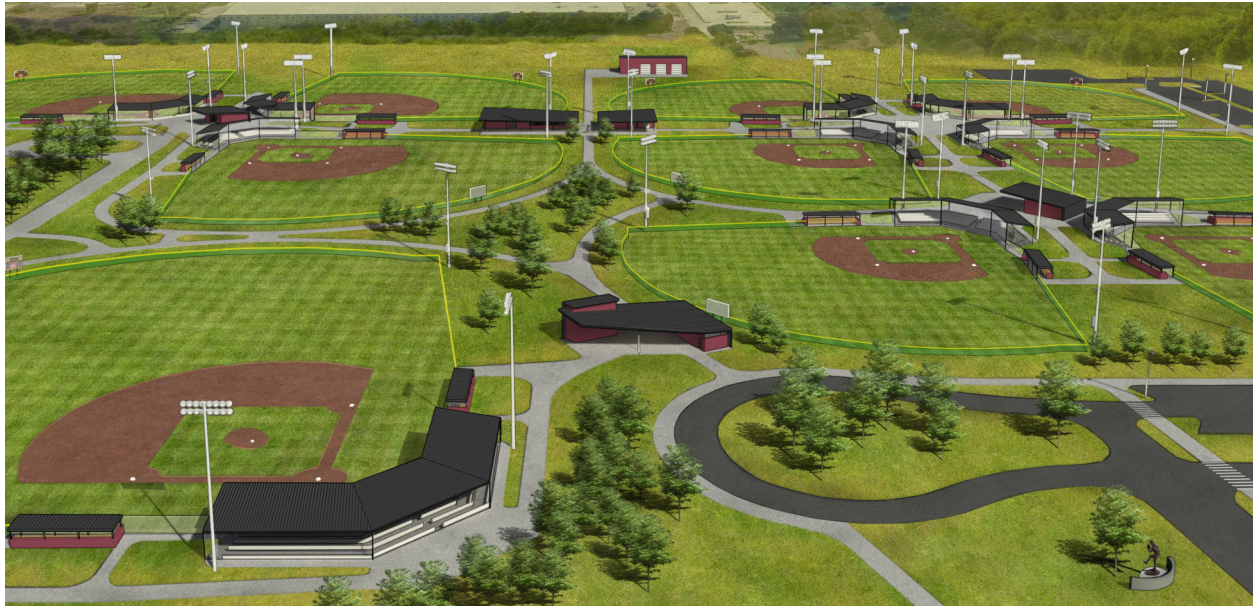
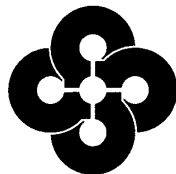


# PROJECT MANUAL:

01/30/26



## PHILLIPS PARK NORTH PAVILION BENTONVILLE, ARKANSAS



### **Crafton Tull**

1450 E. Zion Rd. Suite 9, Fayetteville, AR 72703

Phone : 479.636.4838

Fax: 479.631.6224

[www.craftontull.com](http://www.craftontull.com)

**CTA No. 26300100**

*I hereby certify that these plans and specifications have been prepared by me, or under my supervision. I further certify that to the best of my knowledge these plans and specifications are required in compliance with the Arkansas Fire Prevention Code – Current Edition.*



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ADVERTISEMENT FOR BID



CITY OF BENTONVILLE, ARKANSAS  
PARKS DEPARTMENT  
215 SW A ST., BENTONVILLE, AR 72712  
(479)-464-7275 – [parks@bentonvillear.com](mailto:parks@bentonvillear.com)

## FOR PUBLICATION

PUBLICATION DATES: MAY 24<sup>TH</sup>, 2026; MAY 31<sup>ST</sup>, 2026

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### NOTICE TO BIDDERS

#### PHILLIPS PARK RESTROOM PROJECT

The City of Bentonville, Arkansas is accepting formal, sealed bids from properly qualified and experienced Contractors for the construction, including the supply of necessary labor, materials and equipment, of the Phillips Park Restroom Project, for the City of Bentonville Parks and Recreation Department.

All Bids must be accompanied by a Bid Guarantee in the form of a bid bond, certified check, or cashier's check in the amount of 5% (five percent) of the Total Bid Price, payable without condition to the City of Bentonville, as a guarantee that the Bidder will enter into a contract and execute performance and payment bonds after the Notice of Award has been issued. The Bid Guarantee shall provide that the Bidder or surety must pay the damage, loss, cost, and expense subject to the amount of the Bid Bond directly arising out of the Bidder's default in failing to execute and deliver the Contract and bonds. Personal checks and company checks are NOT acceptable as a Bid Guarantee. Any bid submitted shall be void unless accompanied by a cashier's check drawn upon a bank or trust company doing business in the State of Arkansas or by a corporate bid bond. Bidders shall adhere to the bonding requirements as specified in the Bidding Documents.

There will be a Pre-Bid Meeting held on Thursday, June 18th, 2026, at 1:00 PM CST, located at Crafton Tull's 3<sup>rd</sup> floor conference Room, 901 N 47<sup>th</sup> Street, Rogers, AR 72756. Attendance to the Pre-Bid Meeting is optional, but highly encouraged. City Staff will meet Bidders in attendance and begin the pre-bid meeting at 1:00 PM sharp.

The City reserves the right to cancel this request at any time in accordance with the City's best interest, to reject any Bid received, and to waive irregularities in accordance with the City's best interest. Submitters agree that such rejection shall be without liability on the part of the City of Bentonville for any damage or claim brought by any Bidder because of such rejections, nor shall the Submitter seek any recourse of any kind against the City because of such rejections. The filing of any Bids in response to this Invitation shall constitute an agreement of the Bidder to these conditions.

The awarded Bidder will be required to furnish Performance and Payment Bonds at the time of signing the Contract in amounts equal to the Total Bid Price.

The City encourages all qualified small, minority owned, and women owned business enterprises to submit Bids for capital improvements, projects, and purchases. Encouragement is also made to all general (prime) contractors that in the event they subcontract portions of their work, consideration is given to the identified groups.

Interested parties can obtain the required Bid Packet by emailing [Courtney.Austin@craftontull.com](mailto:Courtney.Austin@craftontull.com)

There will be a Public Bid Opening held at 1:00 PM CST on Thursday, July 2nd, 2026; the Bid Opening will be held at Crafton Tull's 3<sup>rd</sup> floor conference Room, 901 N 47<sup>th</sup> Street, Rogers, AR 72756. All Bid Submissions must be received by Purchasing prior to the Public Bid Opening time. Late Submissions, unsigned Submissions and Submissions which do not contain the required Bid Bond will be rejected, without exception. In accordance with Arkansas Procurement Law and Rules, it is the responsibility of vendors to submit responses at the designated location before the Bid Opening date and time. Bidders who wish to deliver a Bid Submission prior to the Bid Opening date/time may do so by emailing the Bid Submission to [Courtney.Austin@craftontull.com](mailto:Courtney.Austin@craftontull.com).



CITY OF BENTONVILLE, ARKANSAS  
PARKS DEPARTMENT  
215 SW A ST., BENTONVILLE, AR 72712  
(479)-464-7275 – [parks@bentonvillear.com](mailto:parks@bentonvillear.com)

Questions must be submitted via written communication only to [Courtney.Austin@craftontull.com](mailto:Courtney.Austin@craftontull.com). The deadline to submit questions related to this Invitation is June 25<sup>th</sup>, 2026, at 4:30 PM CST, after this time the City will only provide clarifications or responses pertaining to items in the Bidding Documents that do not result in a change or Addendum (see Bidding Documents for additional information).

DEPARTMENT RESPONSIBLE FOR ADVERTISING COSTS: LEGAL

# INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

# INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

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## ARTICLE 1—DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office*—The office from which the Bidding Documents are to be issued, and which registers plan holders.

## ARTICLE 2—BIDDING DOCUMENTS

- 2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.
- 2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.
- 2.03 Bidders may obtain the Bidding Documents as described in the Invitation for Bid by contacting the City of Bentonville Purchasing Department or direct downloading from the Purchasing Page on the City's website. Bidders are strongly encouraged to notify the Purchasing Department that they have downloaded the plans in order to be registered as an official plan holder to ensure they are on the distribution list for Addenda and/or Q&A. Bidders may rely that sets of Bidding Documents obtained from the Purchasing Department are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by the Owner.
- 2.04 *Electronic Documents*
- A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.
1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader latest version. It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.
- B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences

arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

- C. After the Contract is awarded, the Owner will provide or direct the Engineer to provide for the use of the Contractor documents that were developed by Engineer as part of the Project design process, as Electronic Documents in native file formats.
  - 1. Electronic Documents that are available in native file format include:
    - a. **AutoCAD DWGs of plans sheets**
  - 2. Release of such documents will be solely for the convenience of the Contractor. No such document is a Contract Document.
  - 3. Unless the Contract Documents explicitly identify that such information will be available to the Successful Bidder (Contractor), nothing herein will create an obligation on the part of the Owner or Engineer to provide or create such information, and the Contractor is not entitled to rely on the availability of such information in the preparation of its Bid or pricing of the Work. In all cases, the Contractor shall take appropriate measures to verify that any electronic/digital information provided in Electronic Documents is appropriate and adequate for the Contractor's specific purposes.
  - 4. In no case will the Contractor be entitled to additional compensation or time for completion due to any differences between the actual Contract Documents and any related document in native file format.

### **ARTICLE 3—QUALIFICATIONS OF BIDDERS**

- 3.01 Bidder is to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work:
  - A. Written evidence establishing its qualifications such as, previous experience, and present commitments.
  - B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.
  - C. Bidder's state or other contractor license number, if applicable.
  - D. At least three (3) references from within the last two (2) years. References provided must be from the performance of the same or similar type work as described herein. The Owner reserves the right to contact reference provided and use the information obtained in the evaluations of the Bidder's Bid submission.

3.02 *A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.*

3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

#### **ARTICLE 4—PRE-BID CONFERENCE**

4.01 A non-mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference; however, attendance at this conference is not required to submit a Bid.

4.02 Information presented at the pre-Bid conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

#### **ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE**

##### **5.01 *Site and Other Areas***

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

##### **5.02 *Existing Site Conditions***

###### **A. *Subsurface and Physical Conditions; Hazardous Environmental Conditions***

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:
  - a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.
  - b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.
  - c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
  - d. Technical Data contained in such reports and drawings.
2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion

Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

#### 5.03 *Other Site-related Documents*

- A. In addition to the documents regarding existing Site conditions referred to in Paragraph 5.02.A, the following other documents relating to conditions at or adjacent to the Site are known to Owner and made available to Bidders for reference:

1. **N/A**

Owner will make copies of these other Site-related documents available to any Bidder on request.

- B. Owner has not verified the contents of these other Site-related documents, and Bidder may not rely on the accuracy of any data or information in such documents. Bidder is responsible for any interpretation or conclusion Bidder draws from the other Site-related documents.
- C. The other Site-related documents are not part of the Contract Documents.
- D. Bidders are encouraged to review the other Site-related documents, but Bidders will not be held accountable for any data or information in such documents. The requirement to review and take responsibility for documentary Site information is limited to information in (1) the Contract Documents and (2) the Technical Data.
- E. No other Site-related documents are available.

#### 5.04 *Site Visit and Testing by Bidders*

- A. Bidder is allowed to make arrangements to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.
- B. A Site visit can be scheduled upon request. Maps to the Site will be made available upon request.
- C. Bidders visiting the Site are required to arrange their own transportation to the Site.
- D. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the following Owner or Engineer contact for visiting the Site: Crafton Tull Engineer of Record. Bidder must conduct the required Site visit during normal working hours.
- E. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- F. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for

preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.

- G. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- H. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.06 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

## **ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS**

6.01 *Express Representations and Certifications in Bid Form, Agreement*

- A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.
- B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

## **ARTICLE 7—INTERPRETATIONS AND ADDENDA**

- 7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.
- 7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Owner in writing. All questions are to be submitted via email to [wes.burgess@craftontull.com](mailto:wes.burgess@craftontull.com)
- 7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven days prior to the date for opening of Bids may not be answered.
- 7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

## **ARTICLE 8—BID SECURITY**

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of **5** percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.
- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

## **ARTICLE 9—CONTRACT TIMES**

- 9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.
- 9.02 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

## **ARTICLE 10—SUBSTITUTE AND “OR EQUAL” ITEMS**

- 10.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or “or-equal” items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or “or-equal” item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract unless otherwise outlined in the project specifications.
- 10.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

## **ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS**

- 11.01 A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.
- 11.02 If requested by the Owner, the apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of all Subcontractors or Suppliers proposed within five days after Bid opening.
- 11.03 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder’s Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 11.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

## **ARTICLE 12—PREPARATION OF BID**

- 12.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

- B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words “No Bid” or “Not Applicable.”
- 12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.
- 12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.
- 12.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.
- 12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.
- 12.06 A Bid by an individual must show the Bidder’s name and official address.
- 12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.
- 12.08 All names must be printed in ink below the signatures.
- 12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.
- 12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.
- 12.11 The Bid must contain evidence of Bidder’s authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.
- 12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder’s licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder’s state contractor license number, if any, must also be shown on the Bid Form.

## **ARTICLE 13—BASIS OF BID**

### **13.01 *Lump Sum***

- A. Bidders must submit a Bid on a lump sum basis as set forth in the Bid Form.



### 13.02 Allowances

- A. For cash allowances the Bid price must include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

## ARTICLE 14—SUBMITTAL OF BID

- 14.01 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.
- 14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, the name and address of Bidder, and must be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.
- 14.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

## ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

- 15.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 15.03 Bid Document Mistakes: the bidder shall not be allowed to modify or correct mistakes in the bid document after the opening of the bid, unless the mistake is determined to be non-judgmental by the purchasing manager. Failure to complete the entire bid accurately may result in declaring the bid as non-responsive and the bid may be rejected. Bids may be withdrawn by the bidder after submission for revisions or modifications at any time prior to the deadline for receipt of bids (or bid opening). Any such request for withdraw must be in writing either by email or other acceptable electronic manner as outlined in the bidding documents, hand delivered or mailed communication. After bids are opened, they shall be irrevocable for the period specified in the bid documents, unless a nonjudgmental mistake (such as a math error), as determined by the purchasing manager, is suspected by the purchasing manager or the bidder, or unless bidder is permitted to withdraw their bid pursuant to Arkansas State Law. If a nonjudgmental mistake is suspected, such as a math error, the bidder shall submit a written request to the purchasing department requesting either to withdraw their bid submission or to correct the nonjudgmental

mistake. In the event that the city becomes aware of the mistake prior to the bidder, the bidder shall respond within two (2) days of receiving notification of the discovery with a written request to the purchasing department to verify a correction or requesting to withdraw their bid. Any such request for withdraw or correction must be in writing either by email (or other acceptable electronic manner as outlined in the bidding documents), hand delivered or mailed communication. Once a bid has been verified, it shall be considered submitted, as verified.

(1) in the event of discrepancy between a unit price and an extended price, the unit price shall govern.

(2) at no point shall a correction of a mistake result in reduction or increase of a bidder's unit price(s). If correction of the mistake would result in either an increase or decrease in the unit price, the bid shall be considered nonresponsive and shall be rejected.

The city shall permit a bidder to withdraw its bid without penalty or forfeiture of bid security if: (a) a nonjudgmental mistake is evident on the face of the bid, or (b) the bidder establishes by clear and convincing evidence that a nonjudgmental mistake was made.

- 15.04 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

#### **ARTICLE 16—BIDS TO REMAIN SUBJECT TO ACCEPTANCE**

- 16.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

#### **ARTICLE 17—EVALUATION OF BIDS AND AWARD OF CONTRACT**

- 17.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.
- 17.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.
- 17.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.
- 17.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.
- 17.05 *Evaluation of Bids*
- A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

- B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
- 17.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 17.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

#### **ARTICLE 18—BONDS AND INSURANCE**

- 18.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.
- 18.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

#### **ARTICLE 19—SIGNING OF AGREEMENT**

- 19.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

#### **ARTICLE 20—SALES AND USE TAXES**

- 20.01 The City of Bentonville is not tax exempt from any taxes imposed by the State and/or Federal Government.
- 20.02 Applicable taxes should be included on all bids. The City of Bentonville sales tax rate is 9.5%; all products shall be delivered to the City of Bentonville or work shall be performed within City limits.
- 20.03 It is the responsibility of the Bidder to include sales tax in their Bid when applicable regardless of the Bidder's ability to remit sales tax to the State of Arkansas. In no event should applicable taxes cause the City to pay more than the submitted Bid price.

BID FORM FOR CONSTRUCTION  
CONTRACT

# **BID FORM FOR CONSTRUCTION CONTRACT**

The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

## **ARTICLE 1—OWNER AND BIDDER**

- 1.01 This Bid is submitted to: **The City of Bentonville, Arkansas**
- 1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

## **ARTICLE 2—ATTACHMENTS TO THIS BID**

- 2.01 The following documents are submitted with and made a condition of this Bid:
  - A. Required Bid security;
  - B. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
  - C. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;
  - D. Required Bidder Qualification Statement with supporting data; and

### ARTICLE 3—BASIS OF BID—LUMP SUM BID

#### 3.01 *Lump Sum Bids*

- A. Bidder will complete the Work in accordance with the Contract Documents for the following lump sum (stipulated) price(s), together with any Unit Prices indicated in Paragraph 3.02:

1. Lump Sum Price (Single Lump Sum)

|                    |    |
|--------------------|----|
| Lump Sum Bid Price | \$ |
|--------------------|----|

#### 3.02 *Total Bid Price*

|                   |    |
|-------------------|----|
| Total Bid Price – | \$ |
|-------------------|----|

### ARTICLE 4—TIME OF COMPLETION

- 4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 4.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

### ARTICLE 5—BIDDER’S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

#### 5.01 *Bid Acceptance Period*

- A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

#### 5.02 *Instructions to Bidders*

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

#### 5.03 *Receipt of Addenda*

- A. Bidder hereby acknowledges receipt of the following Addenda:

| Addendum Number | Addendum Date |
|-----------------|---------------|
|                 |               |
|                 |               |
|                 |               |

### ARTICLE 6—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

#### 6.01 *Bidder’s Representations*

- A. In submitting this Bid, Bidder represents the following:
1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
  2. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.

3. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
4. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
5. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.
6. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
7. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
8. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
9. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
10. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

#### 6.02 *Bidder's Certifications*

##### A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:

- a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
- b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
- c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
- d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.



BIDDER hereby submits this Bid as set forth above:

Bidder:

\_\_\_\_\_  
(typed or printed name of organization)

By:

\_\_\_\_\_  
(individual's signature)

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Date:

\_\_\_\_\_  
(typed or printed)

*If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.*

Attest:

\_\_\_\_\_  
(individual's signature)

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Date:

\_\_\_\_\_  
(typed or printed)

Address for giving notices:

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

Bidder's Contact:

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Phone:

Email:

Address:

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

Bidder's Contractor License No.: (if applicable)

\_\_\_\_\_

## NON-COLLUSION AFFIDAVIT



## NON-COLLUSION AFFIDAVIT

BID INVALID IF THIS AFFIDAVIT IS NOT SIGNED AND NOTARIZED AND SUBMITTED WITH THE BID

State of \_\_\_\_\_

County of \_\_\_\_\_

I \_\_\_\_\_ (Printed Name of Authorized Representative/Agent) of lawful age, being first duly sworn, on oath says that:

1. They are the duly authorized representative/agent of the Bidder and/or contractor submitting the Competitive Bid and/or procuring the contract which is attached to this statement, for the purpose of certifying the facts pertaining to the existence of collusion among Bidders and between Bidders and City officials or employees, as well as, facts pertaining to the giving or offering of things of value to government personnel in return for special consideration in the letting of any contract pursuant to the Invitation for Bids to which this statement is attached;

2. They are fully aware of the facts and circumstances surrounding the making of the Bid and/or the procurement of the contract to which this statement is attached and have been personally and directly involved in the proceedings leading to the submission of such Bids;

3. Neither the Bidder/contractor nor anyone subject to the Bidder/contractor's direction or control has been a party;

a. to any collusion among Bidders in restraint of freedom of competition by agreement to bid at a fixed rate or to refrain from submitting;

b. to any collusion with any City official or employee as to quantity, quality or price in the prospective contract, or as to any other terms of such prospective contract, nor

c. in any discussions between Bidders and any City official concerning exchange of money or other thing of value for special consideration in the letting of a contract;

d. to paying, giving, donating or agreeing to pay, give or donate to any officer or employee of the City of Bentonville, any money or other thing of value, either directly or indirectly, in procuring the contract to which their statement is attached.

**To be completed by Company (Authorized Representative/Agent):**

Signature of Authorized Representative/Agent: \_\_\_\_\_

Title (of Authorized Representative/Agent): \_\_\_\_\_

**To be completed by Notary (include Seal):**

Subscribed and sworn before me this: \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

Notary Public Signature: \_\_\_\_\_ My commission expires: \_\_\_\_\_

Seal:

BID BOND

## BID BOND (DAMAGES FORM)

|                                                                                                                                                                                                               |                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Bidder</b><br>Name: _____<br>Address <i>(principal place of business)</i> :<br>_____<br>_____                                                                                                              | <b>Surety</b><br>Name: _____<br>Address <i>(principal place of business)</i> :<br>_____<br>_____                                                                                                                   |
| <b>Owner</b><br>Name: <b>City of Bentonville</b><br>Address <i>(principal place of business)</i> :<br><b>305 SW A Street</b><br><b>Bentonville, AR 72712</b>                                                  | <b>Bid</b><br>Project <i>(name and location)</i> :<br><b>City of Bentonville</b><br><b>Phillips Park Restroom</b><br><b>Bentonville, Arkansas</b><br><br>Bid Due Date: <b>July 2<sup>nd</sup>, 2026 1:00pm cst</b> |
| <b>Bond</b><br>Bond Amount: _____<br>Date of Bond: _____                                                                                                                                                      |                                                                                                                                                                                                                    |
| Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative. |                                                                                                                                                                                                                    |
| <b>Bidder</b><br>_____<br><i>(Full formal name of Bidder)</i>                                                                                                                                                 | <b>Surety</b><br>_____<br><i>(Full formal name of Surety) (corporate seal)</i>                                                                                                                                     |
| By: _____<br><i>(Signature)</i>                                                                                                                                                                               | By: _____<br><i>(Signature) (Attach Power of Attorney)</i>                                                                                                                                                         |
| Name: _____<br><i>(Printed or typed)</i>                                                                                                                                                                      | Name: _____<br><i>(Printed or typed)</i>                                                                                                                                                                           |
| Title: _____                                                                                                                                                                                                  | Title: _____                                                                                                                                                                                                       |
| Attest: _____<br><i>(Signature)</i>                                                                                                                                                                           | Attest: _____<br><i>(Signature)</i>                                                                                                                                                                                |
| Name: _____<br><i>(Printed or typed)</i>                                                                                                                                                                      | Name: _____<br><i>(Printed or typed)</i>                                                                                                                                                                           |
| Title: _____                                                                                                                                                                                                  | Title: _____                                                                                                                                                                                                       |
| <i>Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</i>                                      |                                                                                                                                                                                                                    |

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder any difference between the total amount of Bidder's Bid and the total amount of the Bid of the next lowest, responsible Bidder that submitted a responsive Bid, as determined by Owner, for the work required by the Contract Documents, provided that:
  - 1.1. If there is no such next Bidder, and Owner does not abandon the Project, then Bidder and Surety shall pay to Owner the bond amount set forth on the face of this Bond, and
  - 1.2. In no event will Bidder's and Surety's obligation hereunder exceed the bond amount set forth on the face of this Bond.
  - 1.3. Recovery under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
  - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
  - 3.2. All Bids are rejected by Owner, or
  - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions will not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond must be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

## QUALIFICATION STATEMENT

## ARTICLE 1—GENERAL INFORMATION

1.01 Provide contact information for the Business:

|                                       |  |                |  |
|---------------------------------------|--|----------------|--|
| Legal Name of Business:               |  |                |  |
| Corporate Office                      |  |                |  |
| Name:                                 |  | Phone number:  |  |
| Title:                                |  | Email address: |  |
| Business address of corporate office: |  |                |  |
|                                       |  |                |  |
|                                       |  |                |  |
| Local Office                          |  |                |  |
| Name:                                 |  | Phone number:  |  |
| Title:                                |  | Email address: |  |
| Business address of local office:     |  |                |  |
|                                       |  |                |  |
|                                       |  |                |  |

## ARTICLE 2—LICENSING

2.01 Provide information regarding licensure for Business:

|                   |  |                  |  |
|-------------------|--|------------------|--|
| Name of License:  |  |                  |  |
| Licensing Agency: |  |                  |  |
| License No:       |  | Expiration Date: |  |
| Name of License:  |  |                  |  |
| Licensing Agency: |  |                  |  |
| License No:       |  | Expiration Date: |  |

## ARTICLE 3—SURETY INFORMATION

3.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

|                                                                                |                                                          |  |  |
|--------------------------------------------------------------------------------|----------------------------------------------------------|--|--|
| Surety Name:                                                                   |                                                          |  |  |
| Surety is a corporation organized and existing under the laws of the state of: |                                                          |  |  |
| Is surety authorized to provide surety bonds in the Project location?          | <input type="checkbox"/> Yes <input type="checkbox"/> No |  |  |



|                                                                                                                                                                                                                                                                                                                                      |  |                 |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------|--|
| Is surety listed in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury?<br><input type="checkbox"/> Yes <input type="checkbox"/> No |  |                 |  |
| Mailing Address<br>(principal place of business):                                                                                                                                                                                                                                                                                    |  |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |  |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |  |                 |  |
| Physical Address<br>(principal place of business):                                                                                                                                                                                                                                                                                   |  |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |  |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |  |                 |  |
| Phone (main):                                                                                                                                                                                                                                                                                                                        |  | Phone (claims): |  |

#### ARTICLE 4—INSURANCE

- 4.01 Provide information regarding Business’s insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

|                                                                                 |  |                                    |                                                          |
|---------------------------------------------------------------------------------|--|------------------------------------|----------------------------------------------------------|
| Name of insurance provider, and type of policy (CLE, auto, etc.):               |  |                                    |                                                          |
| Insurance Provider                                                              |  | Type of Policy (Coverage Provided) |                                                          |
|                                                                                 |  |                                    |                                                          |
|                                                                                 |  |                                    |                                                          |
|                                                                                 |  |                                    |                                                          |
|                                                                                 |  |                                    |                                                          |
| Are providers licensed or authorized to issue policies in the Project location? |  |                                    | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Does provider have an A.M. Best Rating of A-VII or better?                      |  |                                    | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Mailing Address<br>(principal place of business):                               |  |                                    |                                                          |
|                                                                                 |  |                                    |                                                          |
|                                                                                 |  |                                    |                                                          |
| Physical Address<br>(principal place of business):                              |  |                                    |                                                          |
|                                                                                 |  |                                    |                                                          |
|                                                                                 |  |                                    |                                                          |
| Phone (main):                                                                   |  | Phone (claims):                    |                                                          |

#### ARTICLE 5—CONSTRUCTION EXPERIENCE

- 5.01 Provide information that will identify the overall size and capacity of the Business.

|                                                |  |
|------------------------------------------------|--|
| Average number of current full-time employees: |  |
| Estimate of revenue for the current year:      |  |
| Estimate of revenue for the previous year:     |  |

- 5.02 Provide information regarding the Business's previous contracting experience.

|                                                                                                                                                                       |  |                      |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------|--|--|
| Years of experience with projects like the proposed project:                                                                                                          |  |                      |  |  |
| As a general contractor:                                                                                                                                              |  | As a joint venturer: |  |  |
| Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:                                                                             |  |                      |  |  |
| Been disqualified as a bidder by any local, state, or federal agency within the last 5 years?<br><input type="checkbox"/> Yes <input type="checkbox"/> No             |  |                      |  |  |
| Been barred from contracting by any local, state, or federal agency within the last 5 years?<br><input type="checkbox"/> Yes <input type="checkbox"/> No              |  |                      |  |  |
| Been released from a bid in the past 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No                                                                |  |                      |  |  |
| Defaulted on a project or failed to complete any contract awarded to it? <input type="checkbox"/> Yes <input type="checkbox"/> No                                     |  |                      |  |  |
| Refused to construct or refused to provide materials defined in the contract documents or in a change order? <input type="checkbox"/> Yes <input type="checkbox"/> No |  |                      |  |  |
| Been a party to any currently pending litigation or arbitration? <input type="checkbox"/> Yes <input type="checkbox"/> No                                             |  |                      |  |  |
| Provide full details in a separate attachment if the response to any of these questions is Yes.                                                                       |  |                      |  |  |

- 5.03 List all projects currently under contract in Schedule A and provide indicated information.

- 5.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.

#### **ARTICLE 6—REQUIRED ATTACHMENTS**

- 6.01 Provide the following information with the Statement of Qualifications:

A. Additional items as pertinent.

This Statement of Qualifications is offered by:

Business:

\_\_\_\_\_  
*(typed or printed name of organization)*

By:

\_\_\_\_\_  
*(individual's signature)*

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Date:

\_\_\_\_\_  
*(date signed)*

*(If Business is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest:

\_\_\_\_\_  
*(individual's signature)*

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Address for giving notices:

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

Designated Representative:

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Address:

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

Phone:

\_\_\_\_\_

Email:

\_\_\_\_\_

**Schedule A—Current Projects**

|                                                                                                                     |  |                        |                         |
|---------------------------------------------------------------------------------------------------------------------|--|------------------------|-------------------------|
| Name of Organization                                                                                                |  | Project Name           |                         |
| Project Owner                                                                                                       |  |                        |                         |
| General Description of Project                                                                                      |  |                        |                         |
| Project Cost                                                                                                        |  | Date Project           |                         |
| Key Project Personnel                                                                                               |  | Project Superintendent | Safety Manager          |
| Name                                                                                                                |  |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |  |                        |                         |
| Owner                                                                                                               |  | Name                   | Title/Position          |
| Designer                                                                                                            |  |                        | Organization            |
| Construction Manager                                                                                                |  |                        | Telephone               |
|                                                                                                                     |  |                        | Email                   |
| Project Owner                                                                                                       |  |                        |                         |
| General Description of Project                                                                                      |  | Project Name           |                         |
| Project Cost                                                                                                        |  | Date Project           |                         |
| Key Project Personnel                                                                                               |  | Project Superintendent | Safety Manager          |
| Name                                                                                                                |  |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |  |                        |                         |
| Owner                                                                                                               |  | Name                   | Title/Position          |
| Designer                                                                                                            |  |                        | Organization            |
| Construction Manager                                                                                                |  |                        | Telephone               |
|                                                                                                                     |  |                        | Email                   |
| Project Owner                                                                                                       |  |                        |                         |
| General Description of Project                                                                                      |  | Project Name           |                         |
| Project Cost                                                                                                        |  | Date Project           |                         |
| Key Project Personnel                                                                                               |  | Project Superintendent | Safety Manager          |
| Name                                                                                                                |  |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |  |                        |                         |
| Owner                                                                                                               |  | Name                   | Title/Position          |
| Designer                                                                                                            |  |                        | Organization            |
| Construction Manager                                                                                                |  |                        | Telephone               |
|                                                                                                                     |  |                        | Email                   |
| Project Owner                                                                                                       |  |                        |                         |
| General Description of Project                                                                                      |  | Project Name           |                         |
| Project Cost                                                                                                        |  | Date Project           |                         |
| Key Project Personnel                                                                                               |  | Project Superintendent | Safety Manager          |
| Name                                                                                                                |  |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |  |                        |                         |
| Owner                                                                                                               |  | Name                   | Title/Position          |
| Designer                                                                                                            |  |                        | Organization            |
| Construction Manager                                                                                                |  |                        | Telephone               |
|                                                                                                                     |  |                        | Email                   |
| Project Owner                                                                                                       |  |                        |                         |
| General Description of Project                                                                                      |  | Project Name           |                         |
| Project Cost                                                                                                        |  | Date Project           |                         |
| Key Project Personnel                                                                                               |  | Project Superintendent | Safety Manager          |
| Name                                                                                                                |  |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |  |                        |                         |
| Owner                                                                                                               |  | Name                   | Title/Position          |
| Designer                                                                                                            |  |                        | Organization            |
| Construction Manager                                                                                                |  |                        | Telephone               |
|                                                                                                                     |  |                        | Email                   |

### Schedule B—Previous Experience with Similar Projects

|                                                                                                                     |                 |                        |                         |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|-------------------------|
| Name of Organization                                                                                                |                 | Project Name           |                         |
| Project Owner                                                                                                       |                 |                        |                         |
| General Description of Project                                                                                      |                 |                        |                         |
| Project Cost                                                                                                        | Date Project    |                        |                         |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager          |
| Name                                                                                                                |                 |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                         |
| Owner                                                                                                               | Name            | Title/Position         | Organization            |
| Designer                                                                                                            |                 |                        | Telephone               |
| Construction Manager                                                                                                |                 |                        | Email                   |
|                                                                                                                     |                 |                        |                         |
| Project Owner                                                                                                       |                 | Project Name           |                         |
| General Description of Project                                                                                      |                 |                        |                         |
| Project Cost                                                                                                        |                 | Date Project           |                         |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager          |
| Name                                                                                                                |                 |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                         |
| Owner                                                                                                               | Name            | Title/Position         | Organization            |
| Designer                                                                                                            |                 |                        | Telephone               |
| Construction Manager                                                                                                |                 |                        | Email                   |
|                                                                                                                     |                 |                        |                         |
| Project Owner                                                                                                       |                 | Project Name           |                         |
| General Description of Project                                                                                      |                 |                        |                         |
| Project Cost                                                                                                        |                 | Date Project           |                         |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager          |
| Name                                                                                                                |                 |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                         |
| Owner                                                                                                               | Name            | Title/Position         | Organization            |
| Designer                                                                                                            |                 |                        | Telephone               |
| Construction Manager                                                                                                |                 |                        | Email                   |
|                                                                                                                     |                 |                        |                         |
| Project Owner                                                                                                       |                 | Project Name           |                         |
| General Description of Project                                                                                      |                 |                        |                         |
| Project Cost                                                                                                        |                 | Date Project           |                         |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager          |
| Name                                                                                                                |                 |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                         |
| Owner                                                                                                               | Name            | Title/Position         | Organization            |
| Designer                                                                                                            |                 |                        | Telephone               |
| Construction Manager                                                                                                |                 |                        | Email                   |

### Schedule B—Previous Experience with Similar Projects

|                                                                                                                     |                 |                        |                         |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|-------------------------|
| Name of Organization                                                                                                |                 | Project Name           |                         |
| Project Owner                                                                                                       |                 |                        |                         |
| General Description of Project                                                                                      |                 |                        |                         |
| Project Cost                                                                                                        | Date Project    |                        |                         |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager          |
| Name                                                                                                                |                 |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                         |
| Owner                                                                                                               | Name            | Title/Position         | Organization            |
| Designer                                                                                                            |                 |                        | Telephone               |
| Construction Manager                                                                                                |                 |                        | Email                   |
|                                                                                                                     |                 |                        |                         |
| Project Owner                                                                                                       |                 | Project Name           |                         |
| General Description of Project                                                                                      |                 |                        |                         |
| Project Cost                                                                                                        |                 | Date Project           |                         |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager          |
| Name                                                                                                                |                 |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                         |
| Owner                                                                                                               | Name            | Title/Position         | Organization            |
| Designer                                                                                                            |                 |                        | Telephone               |
| Construction Manager                                                                                                |                 |                        | Email                   |
|                                                                                                                     |                 |                        |                         |
| Project Owner                                                                                                       |                 | Project Name           |                         |
| General Description of Project                                                                                      |                 |                        |                         |
| Project Cost                                                                                                        |                 | Date Project           |                         |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager          |
| Name                                                                                                                |                 |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                         |
| Owner                                                                                                               | Name            | Title/Position         | Organization            |
| Designer                                                                                                            |                 |                        | Telephone               |
| Construction Manager                                                                                                |                 |                        | Email                   |
|                                                                                                                     |                 |                        |                         |
| Project Owner                                                                                                       |                 | Project Name           |                         |
| General Description of Project                                                                                      |                 |                        |                         |
| Project Cost                                                                                                        |                 | Date Project           |                         |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager          |
| Name                                                                                                                |                 |                        | Quality Control Manager |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                         |
| Owner                                                                                                               | Name            | Title/Position         | Organization            |
| Designer                                                                                                            |                 |                        | Telephone               |
| Construction Manager                                                                                                |                 |                        | Email                   |

## NOTICE OF AWARD

## NOTICE OF AWARD

Date of Issuance:

Owner: City of Bentonville  
Engineer: Crafton Tull & Associates  
Project: **Phillips Park Restroom**  
Contract Name: **Phillips Park Restroom**

Owner's Project No.:  
Engineer's Project No.: **26300100**

Bidder: \_\_\_\_\_  
Bidder's Address: \_\_\_\_\_

You are notified that Owner has accepted your Bid dated July 2<sup>nd</sup>, 2026 for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

### Phillips Park Restroom

The Contract Price of the awarded Contract is \$\_\_\_\_\_. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

Unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: **City of Bentonville**

By (signature): \_\_\_\_\_

Name (printed): Stephanie Orman

Title: Mayor

Copy: Crafton Tull & Associates, Engineer



# AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT

# AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between **City of Bentonville** ("Owner") and \_\_\_\_\_ ("Contractor").

Terms used in this Agreement have the meanings stated in the General Conditions and the Supplementary Conditions.

Owner and Contractor hereby agree as follows:

## ARTICLE 1—WORK

- 1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: **Phillips Park Restroom**

## ARTICLE 2—THE PROJECT

- 2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: **Addition of Restroom at Phillips Park in the NE corner of the site.**

## ARTICLE 3—ENGINEER

- 3.01 The Owner has retained Crafton Tull & Associates ("Engineer") to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.
- 3.02 The part of the Project that pertains to the Work has been designed by "Engineer".

## ARTICLE 4—CONTRACT TIMES

### 4.01 *Time is of the Essence*

- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

### 4.02 *Contract Times: Days*

- A. The Work will be substantially complete within **200** days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **230** days after the date when the Contract Times commence to run.

### 4.03 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. *Substantial Completion*: Contractor shall pay Owner \$250.00 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.
  2. *Completion of Remaining Work*: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$250.00 for each day that expires after such time until the Work is completed and ready for final payment.
  3. Liquidated damages for failing to timely attain, Substantial Completion, and final completion are not additive, and will not be imposed concurrently.
- B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

## ARTICLE 5—CONTRACT PRICE

CB. Total of Lump Sum Amount Work contract amount is \$\_\_\_\_\_ (subject to final Unit Price adjustment).

### PAYMENT PROCEDURES

#### 6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

#### 6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the **5th** day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.
1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.
    - a. 95 percent of the value of the Work completed (with the balance being retainage).
    - b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by

Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 *Consent of Surety*

- A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

**ARTICLE 6—CONTRACT DOCUMENTS**

7.01 *Contents*

- A. The Contract Documents consist of all of the following:
  - 1. This Agreement.
  - 2. Bonds:
    - a. Performance bond (together with power of attorney).
    - b. Payment bond (together with power of attorney).
  - 3. General Conditions.
  - 4. Supplementary Conditions.
  - 5. Specifications as listed in the table of contents of the project manual (copy of list attached).
  - 6. Drawings (not attached but incorporated by reference) with each sheet bearing the following general title: **Phillips Park Restroom**
  - 7. Addenda (numbers \_\_\_\_ to \_\_\_\_, inclusive).
  - 8. Exhibits to this Agreement (enumerated as follows):
    - a. **N/A**
  - 9. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
    - a. Notice to Proceed.
    - b. Work Change Directives.
    - c. Change Orders.
    - d. Field Orders.
    - e. Warranty Bond, if any.
- B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).

- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

## **ARTICLE 7—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS**

### **8.01 *Contractor's Representations***

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
  - 1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
  - 2. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
  - 3. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
  - 4. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
  - 5. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.
  - 6. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
  - 7. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
  - 8. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
  - 9. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

10. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

#### 8.02 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
  1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
  2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
  4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

#### 8.03 *Standard General Conditions*

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on \_\_\_\_\_ (which is the Effective Date of the Contract).

Owner:

City of Bentonville

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name: Stephanie Orman

(typed or printed)

Title: Mayor

(typed or printed)

Attest:

(individual's signature)

Title:

(typed or printed)

Address for giving notices:

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

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

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

Phone:

Email:

(If **Owner** is a corporation, attach evidence of authority to sign. If **Owner** is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

Contractor:

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name:

(typed or printed)

Title:

(typed or printed)

(If **Contractor** is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:

(individual's signature)

Title:

(typed or printed)

Address for giving notices:

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

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

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

Phone:

Email:

License No.:

(where applicable)

State: Arkansas

## PERFORMANCE BOND



## PERFORMANCE BOND

|                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contractor</b><br>Name: _____<br>Address (principal place of business):<br>_____<br>_____                                                                                                                                                       | <b>Surety</b><br>Name: _____<br>Address (principal place of business):<br>_____<br>_____                                                                                                                               |
| <b>Owner</b><br>Name: <b>City of Bentonville</b><br>Mailing address (principal place of business):<br><b>3200 SW Municipal Drive</b><br><b>Bentonville, Arkansas 72712</b>                                                                         | <b>Contract</b><br>Description (name and location):<br><b>City of Bentonville</b><br><b>Phillips Park Restroom</b><br><b>Bentonville, AR</b><br>Contract Price: <u>  \$      </u><br>Effective Date of Contract: _____ |
| <b>Bond</b><br>Bond Amount: _____<br>Date of Bond: _____<br><i>(Date of Bond cannot be earlier than Effective Date of Contract)</i><br>Modifications to this Bond form:<br><input type="checkbox"/> None <input type="checkbox"/> See Paragraph 16 |                                                                                                                                                                                                                        |
| Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.                  |                                                                                                                                                                                                                        |
| <b>Contractor as Principal</b><br>Grant Garrett Excavating, Inc.                                                                                                                                                                                   | <b>Surety</b>                                                                                                                                                                                                          |
| _____<br><i>(Full formal name of Contractor)</i>                                                                                                                                                                                                   | _____<br><i>(Full formal name of Surety) (corporate seal)</i>                                                                                                                                                          |
| By: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                                                             | By: _____<br><div style="text-align: center;"><i>(Signature)(Attach Power of Attorney)</i></div>                                                                                                                       |
| Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                                                    | Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                        |
| Title: _____                                                                                                                                                                                                                                       | Title: _____                                                                                                                                                                                                           |
| Attest: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                                                         | Attest: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                             |
| Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                                                    | Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                        |
| Title: _____                                                                                                                                                                                                                                       | Title: _____                                                                                                                                                                                                           |
| <i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>                                |                                                                                                                                                                                                                        |

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:
  - 3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;
  - 3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
  - 3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
  - 5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
  - 5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
  - 5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
  - 5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

- 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
  - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
- 6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.
- 7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
  - 7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
  - 7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
  - 7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
- 8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
- 9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
- 10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
- 11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
- 12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
- 13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

- 14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
  - 14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
  - 14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.
  - 14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
  - 14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
16. Modifications to this Bond are as follows: None

## WARRANTY BOND

## WARRANTY BOND

|                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contractor</b><br>Name: _____<br>Address ( <i>principal place of business</i> ):<br>_____<br>_____                                                                                                                                                  | <b>Surety</b><br>Name: _____<br>Address ( <i>principal place of business</i> ):<br>_____<br>_____                                                                                                                                                                                    |
| <b>Owner</b><br>Name: <b>City of Bentonville</b><br>Mailing address ( <i>principal place of business</i> ):<br><b>3200 SW Municipal Drive</b><br><b>Bentonville, Arkansas 72712</b>                                                                    | <b>Construction Contract</b><br>Description ( <i>name and location</i> ):<br><b>City of Bentonville</b><br><b>Phillips Park Restroom</b><br><b>Bentonville, AR</b><br>Contract Price: _____<br>Effective Date of Contract: _____<br>Contract's Date of Substantial Completion: _____ |
| <b>Bond</b><br>Bond Amount: _____ Bond Period: 12 months after the date of<br>Date of Bond: _____ Certificate of Substantial Completion.<br>Modifications to this Bond form:<br><input type="checkbox"/> None <input type="checkbox"/> See Paragraph 9 |                                                                                                                                                                                                                                                                                      |
| Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth herein, do each cause this Warranty Bond to be duly executed by an authorized officer, agent, or representative.                                           |                                                                                                                                                                                                                                                                                      |
| Contractor as Principal                                                                                                                                                                                                                                | Surety                                                                                                                                                                                                                                                                               |
| _____<br>( <i>Full formal name of Contractor</i> )                                                                                                                                                                                                     | _____<br>( <i>Full formal name of Surety</i> ) ( <i>corporate seal</i> )                                                                                                                                                                                                             |
| By: _____<br>( <i>Signature</i> )                                                                                                                                                                                                                      | By: _____<br>( <i>Signature</i> ) ( <i>Attach Power of Attorney</i> )                                                                                                                                                                                                                |
| Name: _____<br>( <i>Printed or typed</i> )                                                                                                                                                                                                             | Name: _____<br>( <i>Printed or typed</i> )                                                                                                                                                                                                                                           |
| Title: _____                                                                                                                                                                                                                                           | Title: _____                                                                                                                                                                                                                                                                         |
| Attest: _____<br>( <i>Signature</i> )                                                                                                                                                                                                                  | Attest: _____<br>( <i>Signature</i> )                                                                                                                                                                                                                                                |
| Name: _____<br>( <i>Printed or typed</i> )                                                                                                                                                                                                             | Name: _____<br>( <i>Printed or typed</i> )                                                                                                                                                                                                                                           |
| Title: _____                                                                                                                                                                                                                                           | Title: _____                                                                                                                                                                                                                                                                         |
| <i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>                                    |                                                                                                                                                                                                                                                                                      |

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract's Correction Period Obligations. The Construction Contract is incorporated herein by reference.
2. If the Contractor performs the Correction Period Obligations, the Surety and the Contractor shall have no obligation under this Warranty Bond.
3. If Owner gives written notice to Contractor and Surety during the Bond Period of Contractor's obligation under the Correction Period Obligations, and Contractor does not fulfill such obligation, then Surety shall be responsible for fulfillment of such Correction Period Obligations. Surety shall either fulfill the Correction Period Obligations itself, through its agents or contractors, or, in the alternative, Surety may waive the right to fulfill the Correction Period Obligations itself, and reimburse the Owner for all resulting costs incurred by Owner in performing Contractor's Correction Period Obligations, including but not limited to correction, removal, replacement, and repair costs.
4. The Surety's liability is limited to the amount of this Warranty Bond. Renewal or continuation of the Warranty Bond will not modify such amount, unless expressly agreed to by Surety in writing.
5. The Surety shall have no liability under this Warranty Bond for obligations of the Contractor that are unrelated to the Construction Contract. No right of action will accrue on this Warranty Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
6. Any proceeding, legal or equitable, under this Warranty Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and must be instituted within two years after the Surety refuses or fails to perform its obligations under this Warranty Bond.
7. Written notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown in this Warranty Bond.
8. Definitions
  - 8.1. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page of this Warranty Bond, including all Contract Documents and changes made to the agreement and the Contract Documents.
  - 8.2. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
  - 8.3. *Correction Period Obligations*—The duties, responsibilities, commitments, and obligations of the Contractor with respect to correction or replacement of defective Work, as set forth in the Construction Contract's Correction Period clause, EJCDC® C-700, Standard General Conditions of the Construction Contract (2018), Paragraph 15.08, as duly modified.
  - 8.4. *Substantial Completion*—As defined in the Construction Contract.
  - 8.5. *Work*—As defined in the Construction Contract.
9. Modifications to this Bond are as follows: None

## PAYMENT BOND



## PAYMENT BOND

|                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contractor</b><br>Name: _____<br>Address (principal place of business):<br>_____<br>_____                                                                                                                                                       | <b>Surety</b><br>Name: _____<br>Address (principal place of business):<br>_____<br>_____                                                                                                                               |
| <b>Owner</b><br>Name: <b>City of Bentonville</b><br>Mailing address (principal place of business):<br><b>3200 SW Municipal Drive</b><br><b>Bentonville, Arkansas 72712</b>                                                                         | <b>Contract</b><br>Description (name and location):<br><b>City of Bentonville</b><br><b>Phillips Park Restroom</b><br><b>Bentonville, AR</b><br>Contract Price: <u>  \$      </u><br>Effective Date of Contract: _____ |
| <b>Bond</b><br>Bond Amount: _____<br>Date of Bond: _____<br><i>(Date of Bond cannot be earlier than Effective Date of Contract)</i><br>Modifications to this Bond form:<br><input type="checkbox"/> None <input type="checkbox"/> See Paragraph 18 |                                                                                                                                                                                                                        |
| Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.                          |                                                                                                                                                                                                                        |
| Contractor as Principal                                                                                                                                                                                                                            | Surety                                                                                                                                                                                                                 |
| <i>(Full formal name of Contractor)</i>                                                                                                                                                                                                            | <i>(Full formal name of Surety) (corporate seal)</i>                                                                                                                                                                   |
| By: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                                                             | By: _____<br><div style="text-align: center;"><i>(Signature)(Attach Power of Attorney)</i></div>                                                                                                                       |
| Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                                                    | Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                        |
| Title: _____                                                                                                                                                                                                                                       | Title: _____                                                                                                                                                                                                           |
| Attest: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                                                         | Attest: _____<br><div style="text-align: center;"><i>(Signature)</i></div>                                                                                                                                             |
| Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                                                    | Name: _____<br><div style="text-align: center;"><i>(Printed or typed)</i></div>                                                                                                                                        |
| Title: _____                                                                                                                                                                                                                                       | Title: _____                                                                                                                                                                                                           |
| <i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>                                |                                                                                                                                                                                                                        |

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond will arise after the following:
  - 5.1. Claimants who do not have a direct contract with the Contractor
    - 5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
    - 5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).
  - 5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
  - 7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
  - 7.2. Pay or arrange for payment of any undisputed amounts.
  - 7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. Definitions
  - 16.1. *Claim*—A written statement by the Claimant including at a minimum:
    - 16.1.1. The name of the Claimant;
    - 16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;
    - 16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
    - 16.1.4. A brief description of the labor, materials, or equipment furnished;

- 16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
  - 16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
  - 16.1.7. The total amount of previous payments received by the Claimant; and
  - 16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
18. Modifications to this Bond are as follows: None

## DOCUMENT 003132 - GEOTECHNICAL DATA

### 1.1 GEOTECHNICAL DATA

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.
- B. Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, the Owner, the Architect, the Architect's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report shall accept full responsibility for its use.
- C. A geotechnical investigation report for Project, prepared by Terracon, dated September 2, 2022, is available for viewing as appended to this Document.
  - 1. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.
  - 2. Any party using information described in the geotechnical report shall make additional test borings and conduct other exploratory operations that may be required to determine the character of subsurface materials that may be encountered.

END OF DOCUMENT 003132



# Geotechnical Engineering Report

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**Phillips Park Improvements  
Bentonville, Arkansas**

September 2, 2022

Terracon Project No. KB225005

**Prepared for:**

Crafton Tull & Associates, Inc.  
Rogers, Arkansas

**Prepared by:**

Terracon Consultants, Inc.  
Rogers, Arkansas



September 2, 2022

Crafton Tull & Associates, Inc.  
91 North 47th Suite, Suite 400  
Rogers, Arkansas 72756



Attn: Mr. Barry Williams  
P: (479) 636-4838  
E: Barry.Williams@craftontull.com

Re: Geotechnical Engineering Report  
Phillips Park Improvements  
SE 28th Street  
Bentonville, Arkansas  
Terracon Project No. KB225005

Dear Mr. Williams:

We have completed the Geotechnical Engineering evaluation for the referenced project. This study was performed in general accordance with Terracon Proposal No. PKB225005 dated February 28, 2022. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations and floor slabs for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

**Terracon Consultants, Inc.**

*Certificate of Authorization No. 223, expires 12/31/2023*

Christopher Reid, E.I.  
Field Engineer

Michael H. Homan, P.E.  
Office Manager/Senior Principal



## REPORT TOPICS

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**Note:** This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the **GeoReport** logo will bring you back to this page. For more interactive features, please view your project online at [client.terracon.com](http://client.terracon.com).

## ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES  
SITE LOCATION AND EXPLORATION PLANS  
EXPLORATION RESULTS  
SUPPORTING INFORMATION

**Note:** Refer to each individual Attachment for a listing of contents.



# Geotechnical Engineering Report

## Phillips Park Improvements

SE 28th Street

Bentonville, Arkansas

Terracon Project No. KB225005

September 2, 2022

## INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering evaluation performed for the proposed baseball fields at SE 28th Street in Bentonville, Arkansas. This report describes the subsurface conditions encountered at the boring locations, presents the test data, and provides geotechnical recommendations for the following items:

- Earthwork
- Pavements
- Shallow foundations
- Seismic site class
- Floor slabs

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and as separate graphs in the **Exploration Results** section.

## SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

| Item                         | Description                                                                                                                                                                                                                                  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Parcel Information</b>    | The project is located at the existing Phillips Park adjacent to SE 28th Street in Bentonville, Arkansas.<br>Latitude 36.3416°, Longitude -94.2026° (approximate) (See Exhibit D)                                                            |
| <b>Existing Improvements</b> | Existing park with baseball/softball fields, green areas, and paved parking and drive areas.                                                                                                                                                 |
| <b>Current Ground Cover</b>  | Most of the site is covered in landscape grass. Moderate to heavy tree vegetation covers the southern portion of the site.                                                                                                                   |
| <b>Existing Topography</b>   | Based on available Google Earth Pro™ aerial imagery, the site appears to be at a higher elevation in the center and lower elevations toward the boundaries. About 10 feet of elevation difference was estimated from the Google Earth image. |

## PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

| Item                            | Description                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Proposed Structures</b>      | <p>The project includes improvements to the existing Philips Park in Bentonville, Arkansas. The various improvements include:</p> <ul style="list-style-type: none"> <li>■ New restroom and service facility buildings</li> <li>■ Artificial turf-lined fields</li> <li>■ New parking and drive areas</li> </ul>                     |
| <b>Finished Floor Elevation</b> | <p>The FFE of the structures was not provided. We anticipate the FFEs will be at or near existing grade. We do understand that the bleachers behind home base will be constructed on about 7 feet of fill.</p>                                                                                                                       |
| <b>Maximum Loads</b>            | <p>Anticipated structural loads for the new buildings were not provided. Based on our experience with similar structures, we have considered the following maximum loads:</p> <ul style="list-style-type: none"> <li>■ Columns: 50 kips</li> <li>■ Walls: 2 kips per linear foot</li> </ul> <p>Slabs: 100 pounds per square foot</p> |
| <b>Grading/Slopes</b>           | <p>A site grading plan was not provided. We assume that no grading will be required for the project.</p> <p>Final slope angles of 3H:1V (Horizontal: Vertical) or flatter are expected.</p>                                                                                                                                          |
| <b>Pavements</b>                | <p>No information regarding anticipated vehicle types, axle loads, or traffic volumes was provided. We anticipate the pavements will be utilized primarily by passenger vehicles (cars, pickup trucks, SUV's) with occasional panel delivery trucks and trash collection trucks.</p>                                                 |

## GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** section and the GeoModel can be found in the **Figures** section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

## Geotechnical Engineering Report

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September 2, 2022 ■ Terracon Project No. KB225005



| Model Layer | Layer Name           | General Description                  |
|-------------|----------------------|--------------------------------------|
| 1           | Topsoil and Pavement | Topsoil and asphalt pavement         |
| 2           | Lean Clay            | Lean clay with minor amounts of sand |

The borings were observed during drilling and shortly after completion of drilling for the presence and level of water. Groundwater was not observed in the borings during or immediately after drilling. As this is a public facility, we did not leave the boreholes open overnight. A longer period may be required for groundwater to develop and stabilize in a borehole. Longer term observations in piezometers or observation wells, sealed from the influence of surface water, are often required to define groundwater levels.

Groundwater levels may fluctuate due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the borings were performed. "Perched" water could occur above lower permeability soil layers and/or near the soil/bedrock interface, and "trapped" water could be present within existing fill materials. Therefore, groundwater conditions at other times may be different than the conditions encountered in our exploratory borings. The potential for water level fluctuations and perched water should be considered when developing design and construction plans and specifications for the project.

## GEOTECHNICAL OVERVIEW

Based on conditions encountered at the boring locations, it appears feasible to support the new buildings on shallow spread footings bearing on medium stiff to stiff native clay or engineered fill materials. Bedrock was not encountered, thus, we anticipate that shallow excavations will be successful with standard construction equipment.

The **General Comments** section provides an understanding of the report limitations.

## EARTHWORK

Site preparation, excavation, subgrade preparation and placement of engineered fills should conform to recommendations presented in this section. The recommendations presented for design and construction of earth-supported elements including foundations, slabs, and pavements are contingent upon the recommendations outlined in this section being followed. We recommend earthwork on this project be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of subgrade preparation, engineered fill, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

## Site Preparation

Pavement, surface vegetation, topsoil and any other existing surface or subsurface structures, should be removed from the construction areas.

After stripping and completing the required cuts for low-strength soils and prior to placing fill, the subgrade should be proof-rolled to aid in locating soft, unstable areas. A Terracon geotechnical engineer or senior technician should observe each site to confirm that the site has been effectively stripped of unsuitable materials. They should also monitor proof-rolling procedures to evaluate and approve the stability of the exposed subgrade materials. Proof-rolling can be performed with a rubber-tired construction vehicle weighing at least 25 tons, such as a loaded scraper or tandem-axle dump truck. If proof-rolling is not practical, the subgrade should be evaluated by Terracon using other methods.

Where unstable areas are identified, they should be scarified, moisture-conditioned, and compacted, or removed and replaced full-depth with new engineered fill. The appropriate method of improvement, if required, would depend on factors such as schedule, weather, depth of unstable soils, the size of area to be improved, and the nature of the instability. Performing site grading operations during warm, dry periods would help reduce the amount of subgrade conditioning required.

Close monitoring of the site preparation operations will be critical in providing proper subgrade support for fill placement and support of on-grade support slabs and pavements. This is why we recommend that Terracon be retained during initial critical phases of the earthwork to observe the actual site conditions and make necessary recommendations.

## Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below, or within 5 feet of structures, pavements or constructed slopes. General fill is material used to achieve grade outside of these areas. Earthen materials used for structural and general fill should meet the following material property requirements:

| Soil Type <sup>1</sup>                                            | USCS Classification           | Acceptable Location for Placement |
|-------------------------------------------------------------------|-------------------------------|-----------------------------------|
| Imported Low Volume Change (LVC) Material <sup>2</sup>            | CL, GC<br>$8 \leq PI \leq 20$ | All locations and elevations      |
| Imported Low Volume Change (LVC) "Hillside" Material <sup>3</sup> | GC                            | All locations and elevations      |

| Soil Type <sup>1</sup> | USCS Classification | Acceptable Location for Placement                                                                         |
|------------------------|---------------------|-----------------------------------------------------------------------------------------------------------|
| On-site Material       | CL, GC              | All locations and elevations provided the soil meets the LVC material criteria in footnotes 2 or 3 below. |
|                        | CH                  | Not recommended as structural fill material                                                               |
|                        | Broken Chert        | Not recommended as structural fill material                                                               |

1. Controlled, compacted fill should consist of approved materials that are free of organic matter and debris and contain maximum rock size of 3 inches. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the geotechnical engineer for evaluation.
2. Approved, off-site low plasticity coarse-grained soil having a plasticity index (PI) of 8 to 20 and containing at least 15% fines (material passing the No. 200 sieve, based on dry weight).
3. Locally available clayey gravel ("hillside") material with liquid limit (LL) of 45 or less and PI of 20 or less, or if the LL is greater than 45, material should have less than 35 percent passing No. 200 sieve. Clayey gravel material should have a maximum rock size of 3 inches.

## Fill Compaction Requirements

| Item                                                | Structural Fill                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Maximum Lift Thickness</b>                       | 8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used<br>4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used                                                                                |
| <b>Minimum Compaction Requirements <sup>1</sup></b> | At least 95 percent of the material's standard Proctor maximum dry unit weight (ASTM D 698). Where fill thicknesses at the structure are greater than 5 feet, compaction below the 5-foot depth should be increased to at least 98 percent of the maximum dry unit weight by ASTM D 698. |
| <b>Water Content Range <sup>1</sup></b>             | Cohesive: -2% to +2% of optimum<br>Granular: Workable moisture levels                                                                                                                                                                                                                    |

1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698).

We recommend that structural fill be tested for moisture content and compaction during placement. If the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.

## Utility Trench Backfill

All trench excavations should be made with sufficient working space to permit construction including backfill placement and compaction. If utility trenches are backfilled with relatively clean

granular material, they should be capped with at least 18 inches of clay fill to reduce the infiltration and conveyance of surface water through the trench backfill.

Utility trenches are common sources of water infiltration and migration. All utility trenches that penetrate beneath buildings should be effectively sealed to restrict water intrusion and flow through the trenches that could migrate below the building. We recommend constructing an effective “trench plug” that extends at least 5 feet out from the face of the building exterior. The plug material should consist of clay compacted as recommended in **Earthwork**. The clay fill should be placed to completely surround the utility line and be compacted in accordance with recommendations in this report. Alternatively, flowable fill could be used to construct the trench plug.

## **Grading and Drainage**

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. Roofs should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the building.

Exposed ground should be sloped and maintained at a minimum 5% away from buildings for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structures should also be periodically inspected and adjusted, as necessary, as part of the structure’s maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

## **Excavations**

Shallow excavations for the proposed structures are anticipated to be accomplished with conventional construction equipment. Terracon should be retained during construction to observe earthwork and to perform necessary tests and observations during subgrade preparation; removal of low-strength soils and existing fills; proof-rolling; placement and compaction of engineered fills; and just prior to construction of on-grade floor slabs, pavements and foundations. As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, “Excavations” and its appendices, and in accordance with any applicable local, and/or state regulations.

## **Earthwork Construction Considerations**

Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs and pavements. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

## **Construction Observation and Testing**

The earthwork efforts should be observed and tested by a representative of the Geotechnical Engineer. Observation and testing should include documentation of adequate removal of vegetation and topsoil, proofrolling, and mitigation of areas delineated by the proofroll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test should be performed for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated by a representative of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should be contacted to discuss mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

## **SHALLOW FOUNDATIONS**

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.



## Design Parameters – Compressive Loads

| Item                                                                 | Description                                                                                          |
|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>Maximum Net Allowable Bearing pressure</b> <sup>1, 2</sup>        | 2,000 psf in medium stiff to very stiff native clay or properly compacted and tested structural fill |
| <b>Required Bearing Stratum</b> <sup>3</sup>                         | Medium stiff to very stiff native lean clay or tested and approved structural fill                   |
| <b>Minimum Foundation Dimensions</b>                                 | Columns: 30 inches<br>Continuous: 18 inches                                                          |
| <b>Minimum Embedment below Finished Grade</b> <sup>4</sup>           | Exterior footings in unheated areas: 24 inches<br>Interior footings in heated areas: 12 inches       |
| <b>Estimated Total Settlement from Structural Loads</b> <sup>2</sup> | Less than about 1 inch                                                                               |
| <b>Estimated Differential Settlement</b> <sup>2, 5</sup>             | About 3/4 of total settlement                                                                        |

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2. Values provided are for maximum loads noted in **Project Description**.
3. Unsuitable or soft soils should be over-excavated and replaced per the recommendations presented in the **Earthwork**.
4. Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
5. Differential settlements are as measured over a span of 50 feet.

## Foundation Construction Considerations

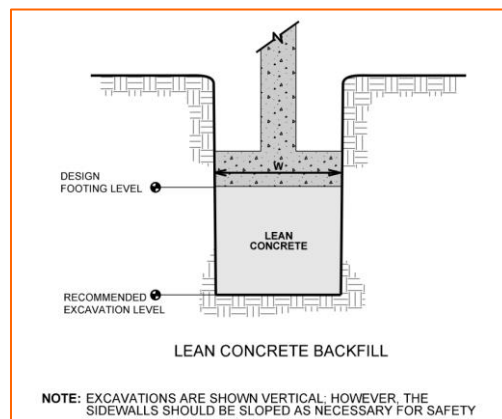
The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

If unsuitable bearing soils are encountered at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. This is illustrated on the sketch below.

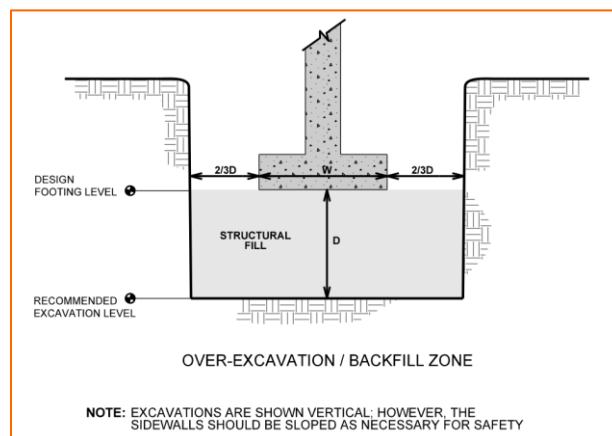


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Over-excavation for structural fill placement below footings should be conducted as shown below. The over-excavation should be backfilled up to the footing base elevation, with structural fill placed, as recommended in the **Earthwork** section.



## SEISMIC CONSIDERATIONS

| Code                                                                                                                                                                                                                                                                                                                                                                     | Site Class     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| 2012 International Building Code (IBC)                                                                                                                                                                                                                                                                                                                                   | D <sup>1</sup> |
| <p>1. The 2012 International Building Code (IBC) seismic site class definitions are based on average properties of the subsurface profile to a depth of 100 feet. The exploratory borings terminated within clay at a maximum depth of 15 feet. Our opinion of site class is based on boring data and our knowledge of local geological and geotechnical conditions.</p> |                |

## FLOOR SLABS

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

### Floor Slab Design Parameters

| Item                                                       | Description                                                                                   |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Floor Slab Support <sup>1</sup></b>                     | Floor slabs should be constructed on at least 12 inches of low volume change structural fill. |
| <b>Estimated Modulus of Subgrade Reaction <sup>2</sup></b> | 100 pounds per square inch per inch (psi/in) for point loads                                  |
| <b>Aggregate base course/capillary break <sup>3</sup></b>  | 4 inches of free draining granular material or as required by design                          |

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.
3. Free-draining granular material should consist of ASTM No. 57 or 67 stone. Other design considerations such as cold temperatures and condensation development could warrant more extensive design provisions. This material could be considered as part of the recommended low volume change material thickness.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut contraction joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient contraction joints, appropriate reinforcing or other means.

Loads on footings that support structural walls and column loads are typically greater than floor slab loads. Consequently, footings should be expected to settle more than the adjacent floor slabs. The structural engineer should consider the potential for differential movement between foundations and grade-supported floor slabs.

### **Floor Slab Construction Considerations**

The subgrade should be maintained within the moisture content range recommended for structural fill until the floor slab is constructed. If the subgrade becomes desiccated prior to construction of the floor slab, the affected material should be removed or the materials should be scarified, moistened, and compacted. Upon completion of grading operations in the building area, care should be taken to maintain the subgrade within the moisture content and density ranges recommended for engineered fill prior to construction of the building floor slab.

On most project sites, the site grading is generally accomplished early in the construction phase. However, as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, rainfall etc. As a result, the floor slab subgrade soils may not be suitable for placement of the granular course and/or concrete at the time of building construction, and corrective action may be required.

Terracon should evaluate the condition of the floor slab subgrades immediately prior to placement of the granular leveling course and construction of the slabs. Particular attention should be paid to areas containing backfilled trenches and high traffic areas that were previously disturbed during construction. Where unsuitable conditions are located within the floor slab subgrade soils, the subgrade should be improved by removing and replacing the affected material with properly compacted fill.

## **PAVEMENTS**

### **General Pavement Comments**

Pavement thickness designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

### **Pavement Design Parameters**

Design of Asphaltic Concrete (AC) pavements are based on the procedures outlined in the National Asphalt Pavement Association (NAPA) Information Series 109 (IS-109). Design of Portland Cement Concrete (PCC) pavements are based upon American Concrete Institute (ACI) 330; Guide for Design and Construction of Concrete Parking Lots.

A subgrade CBR of 3 was used for the AC pavement designs, and a modulus of subgrade reaction of 75 pci was used for the PCC pavement designs. The values were empirically derived based upon our experience with the lean clay subgrade soils and our understanding of the quality of the subgrade as prescribed by the **Site Preparation** conditions as outlined in **Earthwork**. A modulus of rupture of 500 psi was used for pavement concrete.

## Pavement Section Thicknesses

The following table provides options for AC and PCC Sections:

| Pavement Type                  | Parking Lots                                                                                       | Drives                                                                                             |
|--------------------------------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>ACC over aggregate base</b> | 2 inches ACC surface<br>2 inches ACC base<br>6 inches aggregate base<br>(ARDOT Class 7 or similar) | 2 inches ACC surface<br>4 inches ACC base<br>6 inches aggregate base<br>(ARDOT Class 7 or similar) |
| <b>PCC</b>                     | 5 inches PCC<br>4 inches open graded rock<br>(ASTM C33 Size No. 57 aggregate or similar)           | 6 inches PCC<br>4 inches open graded rock<br>(ASTM C33 Size No. 57 aggregate or similar)           |

1. For trash container pads, we recommend a PCC pavement section be used consisting of 7 inches (minimum) of PCC over 4 inches (minimum) of open graded rock (ASTM C33 Size No. 57 aggregate or similar) on a compacted soil subgrade. The trash container pad should be large enough to support the container and the tipping axle of the collection truck.

## Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section.

## Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is

recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Slope final grade adjacent to paved areas down from the edges at a minimum 2%.
- Provide a minimum 2% slope on subgrade and pavement surfaces to promote proper surface drainage.
- Install below pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

## **GENERAL COMMENTS**

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for

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third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, cost estimating, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

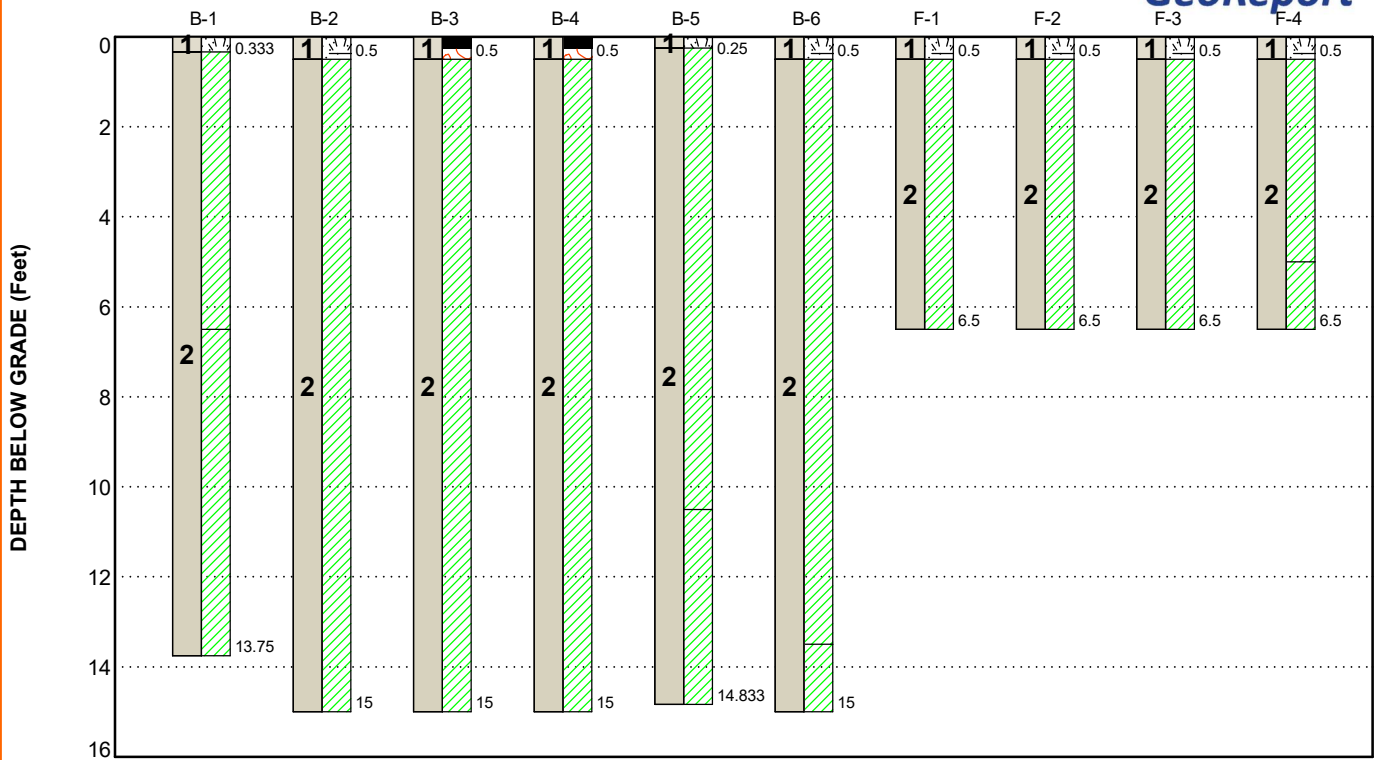
## FIGURES

### Contents:

GeoModel

## GEOMODEL

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This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

| Model Layer | Layer Name           | General Description                   |
|-------------|----------------------|---------------------------------------|
| 1           | Topsoil and Pavement | Topsoil and asphalt pavement          |
| 2           | Lean Clay            | Lean clay with minor ammounts of sand |

## LEGEND

 Topsoil

 Aggregate Base Course

 Lean Clay

 Asphalt

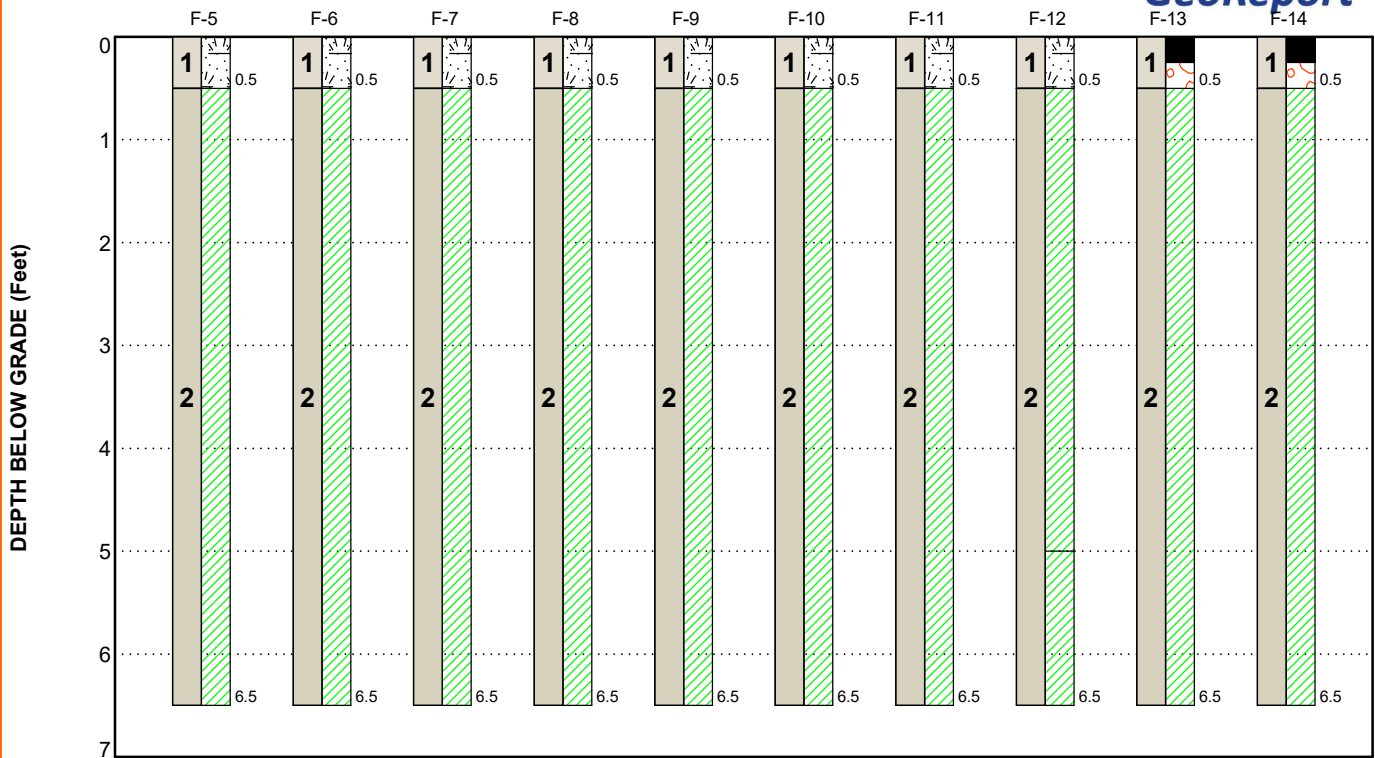
## NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.



## GEOMODEL

Phillips Park Improvements ■ Bentonville, AR  
Terracon Project No. KB225005



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

| Model Layer | Layer Name           | General Description                   |
|-------------|----------------------|---------------------------------------|
| 1           | Topsoil and Pavement | Topsoil and asphalt pavement          |
| 2           | Lean Clay            | Lean clay with minor ammounts of sand |

### LEGEND

 Topsoil

 Aggregate Base Course

 Lean Clay

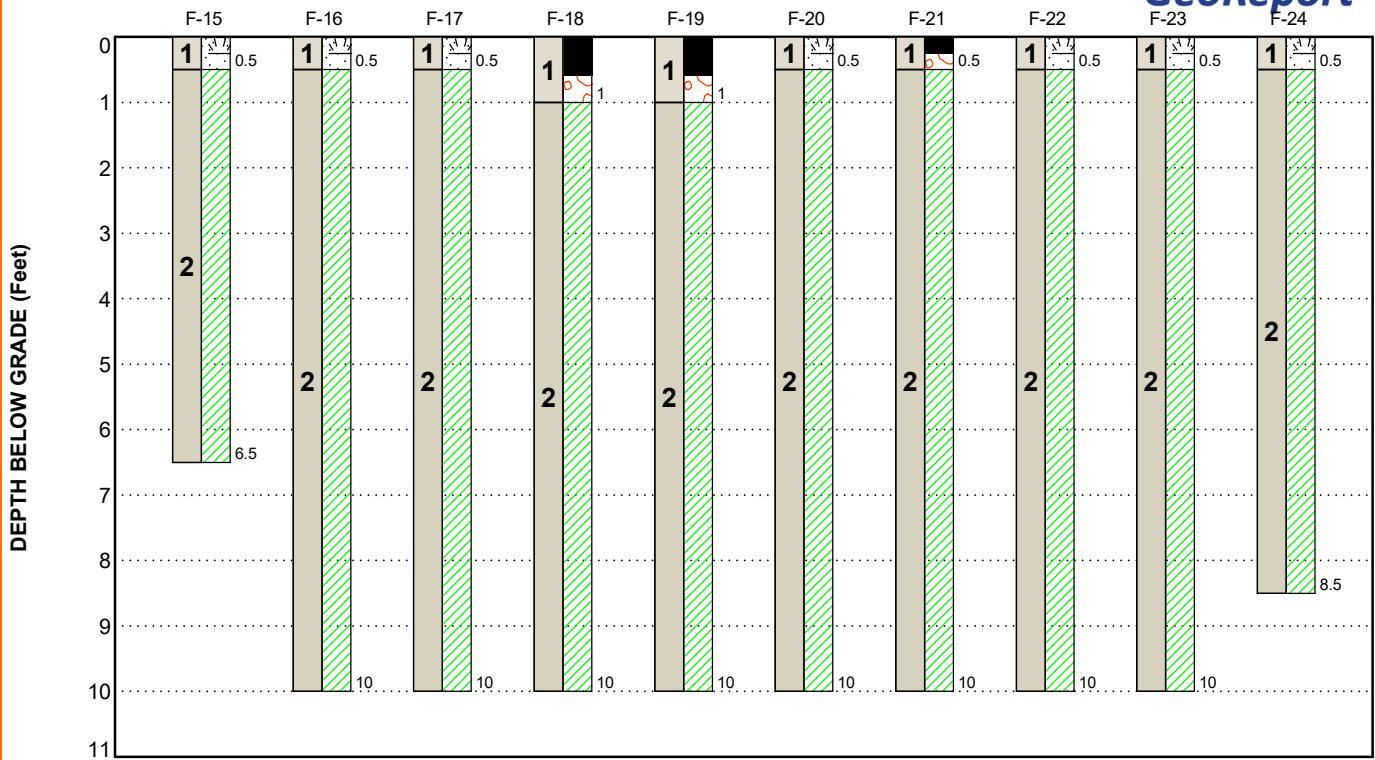
 Asphalt

### NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

## GEOMODEL

Phillips Park Improvements ■ Bentonville, AR  
Terracon Project No. KB225005



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

| Model Layer | Layer Name           | General Description                   |
|-------------|----------------------|---------------------------------------|
| 1           | Topsoil and Pavement | Topsoil and asphalt pavement          |
| 2           | Lean Clay            | Lean clay with minor ammounts of sand |

## LEGEND

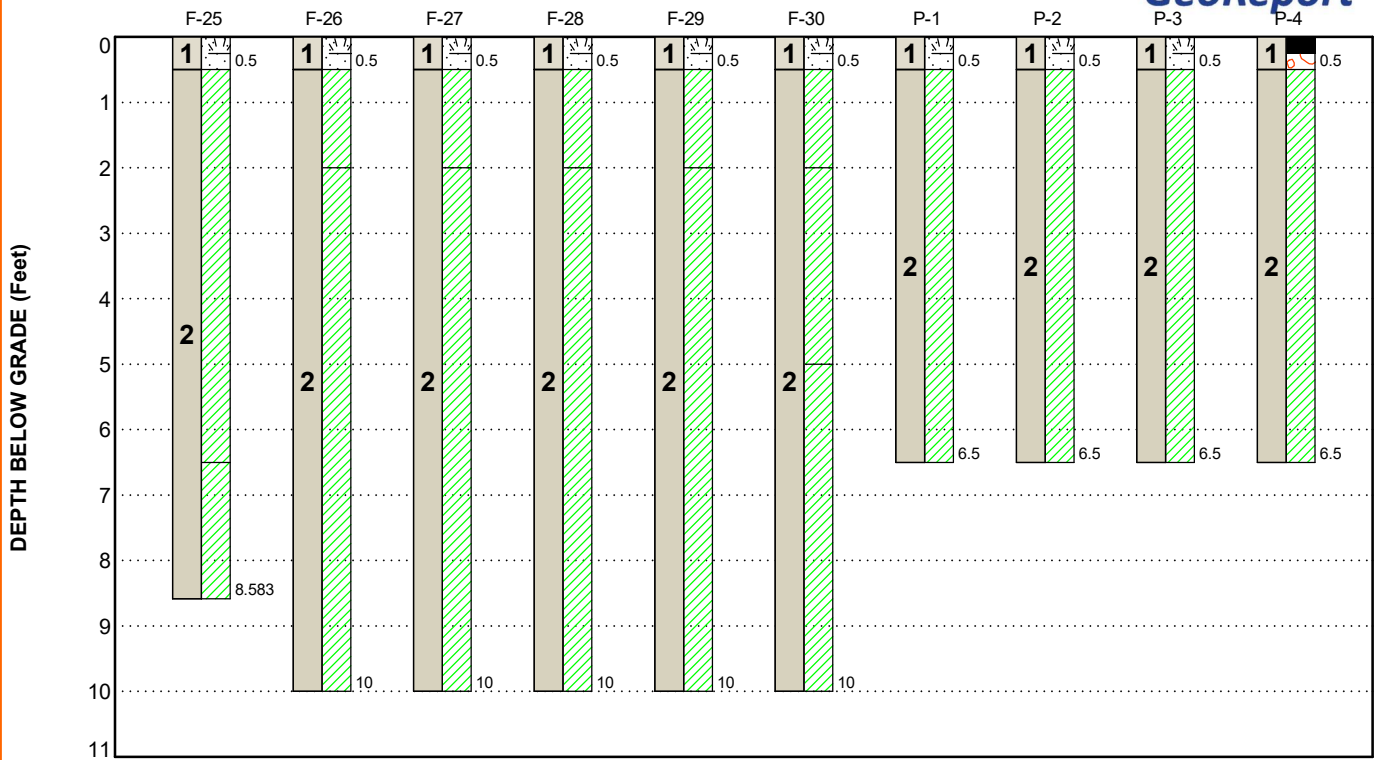
- Topsoil
- Aggregate Base Course
- Lean Clay
- Asphalt

## NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

## GEOMODEL

Phillips Park Improvements ■ Bentonville, AR  
Terracon Project No. KB225005



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

| Model Layer | Layer Name           | General Description                   |
|-------------|----------------------|---------------------------------------|
| 1           | Topsoil and Pavement | Topsoil and asphalt pavement          |
| 2           | Lean Clay            | Lean clay with minor ammounts of sand |

## LEGEND

Topsoil

Aggregate Base Course

Lean Clay

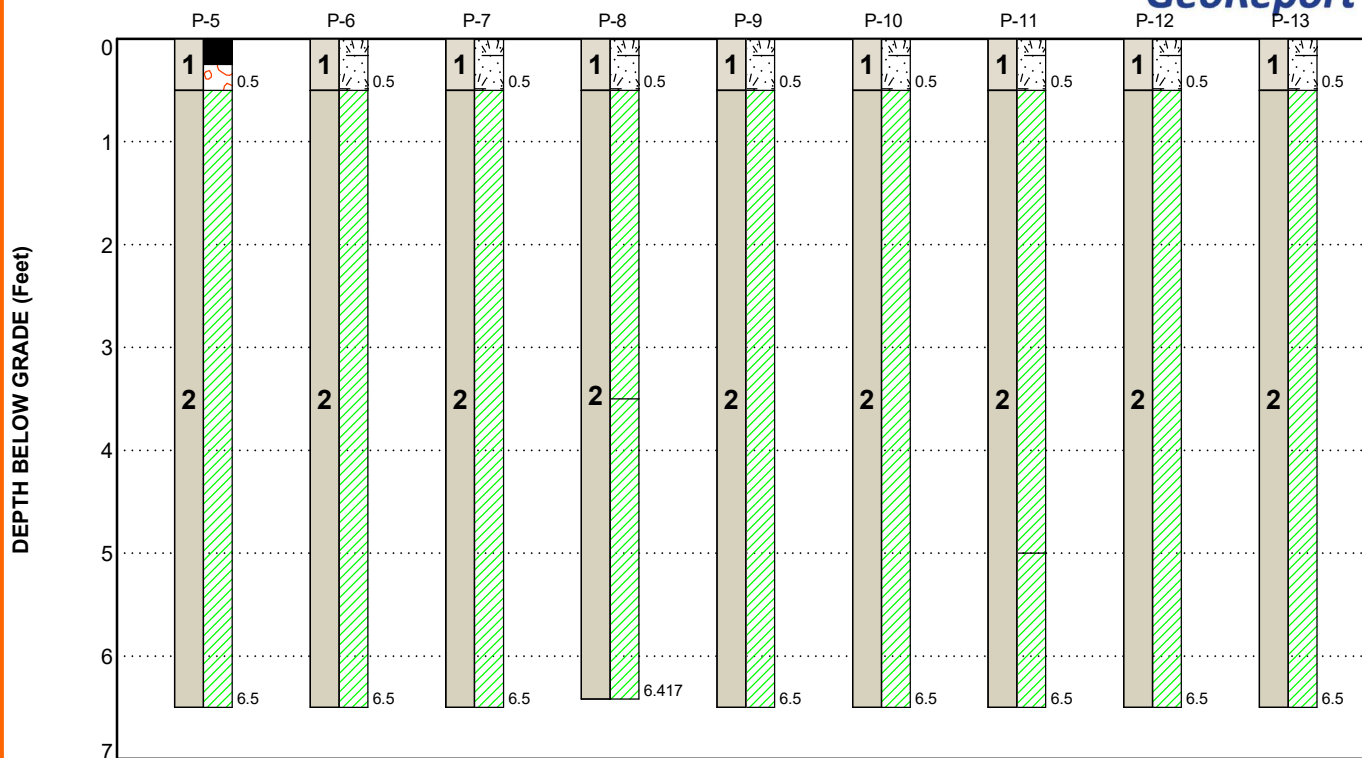
Asphalt

## NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

## GEOMODEL

Phillips Park Improvements ■ Bentonville, AR  
Terracon Project No. KB225005



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

| Model Layer | Layer Name           | General Description                   |
|-------------|----------------------|---------------------------------------|
| 1           | Topsoil and Pavement | Topsoil and asphalt pavement          |
| 2           | Lean Clay            | Lean clay with minor ammounts of sand |

## LEGEND

- Asphalt
- Topsoil
- Aggregate Base Course
- Lean Clay

## NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

## ATTACHMENTS

## EXPLORATION AND TESTING PROCEDURES

### Field Exploration

| Number of Borings | Planned Boring Depth (feet) <sup>1</sup> | Planned Location                |
|-------------------|------------------------------------------|---------------------------------|
| 30                | 10                                       | Baseball/Softball Field Borings |
| 6                 | 15                                       | Building Borings                |
| 13                | 6                                        | Pavement Borings                |

<sup>1.</sup> Below ground surface.

**Boring Layout and Elevations:** Unless otherwise noted, Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about  $\pm 10$  feet). If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

**Subsurface Exploration Procedures:** We advanced the borings with a track-mounted drill rig utilizing continuous flight augers. The borings were sampled using split-spoon sampling procedures. The field exploration was performed during August 2022. The field exploration also included observations for groundwater while the borehole was being advanced. The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

### Laboratory Testing

Representative soil samples were tested in the laboratory to measure their natural water content, percent passing the No. 200 sieve, and Atterberg limits. The test results are provided on the boring logs included in **Exploration Results**.

The soil samples were classified in the laboratory based on visual observation, texture, plasticity, and the laboratory testing described above. The soil descriptions presented on the boring logs are in accordance with the enclosed General Notes and Unified Soil Classification System (USCS). The estimated USCS group symbols for native soils are shown on the boring logs, and a brief description of the USCS is included in this report.

## **SITE LOCATION AND EXPLORATION PLANS**

### **Contents:**

Site Location Plan

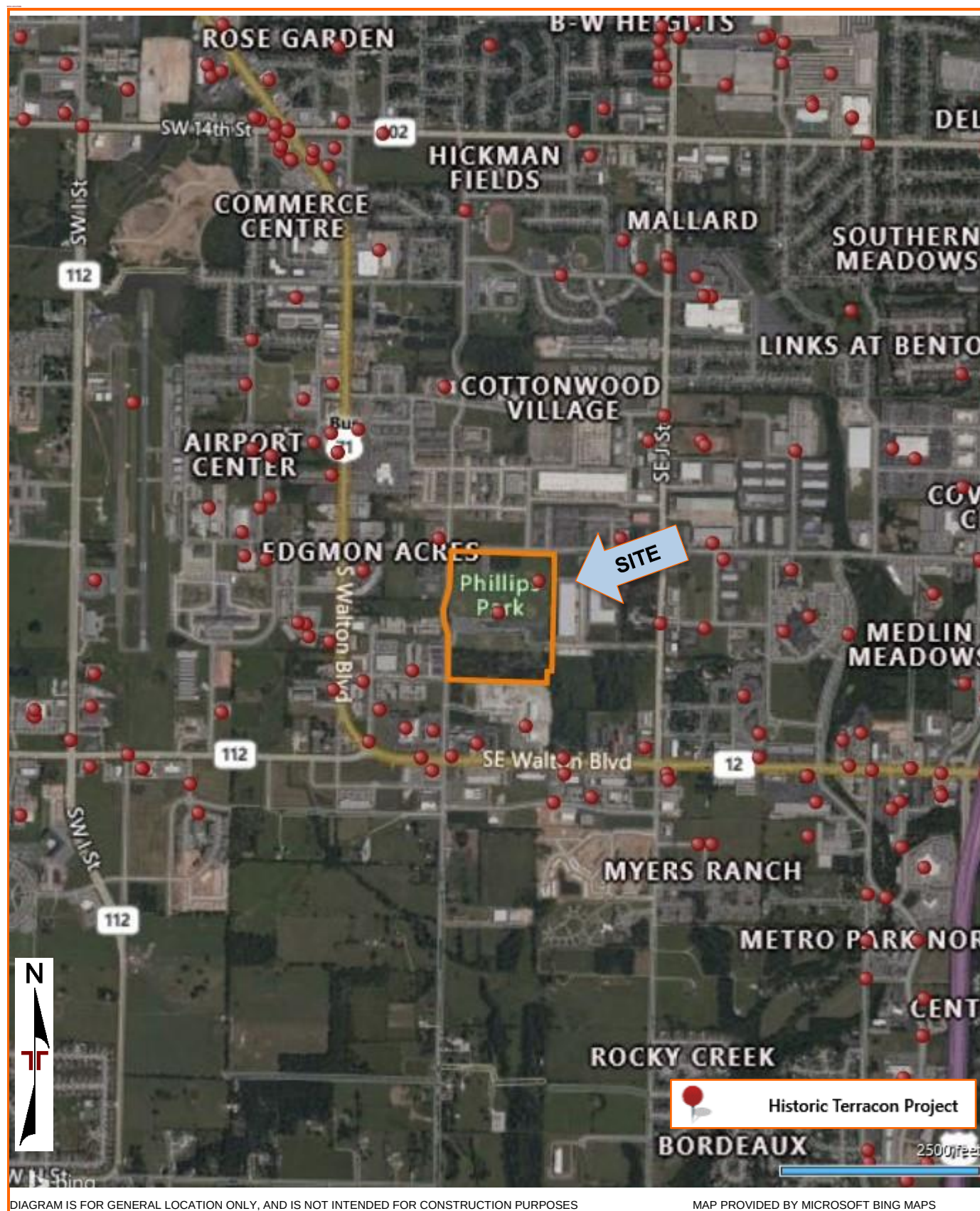
Exploration Plan

Note: All attachments are one page unless noted above.



## SITE LOCATION

Phillips Park Improvements ■ Bentonville, Arkansas  
September 2, 2022 ■ Terracon Project No. KB225005





## EXPLORATION PLAN

Phillips Park Improvements ■ Bentonville, Arkansas  
September 2, 2022 ■ Terracon Project No. KB225005

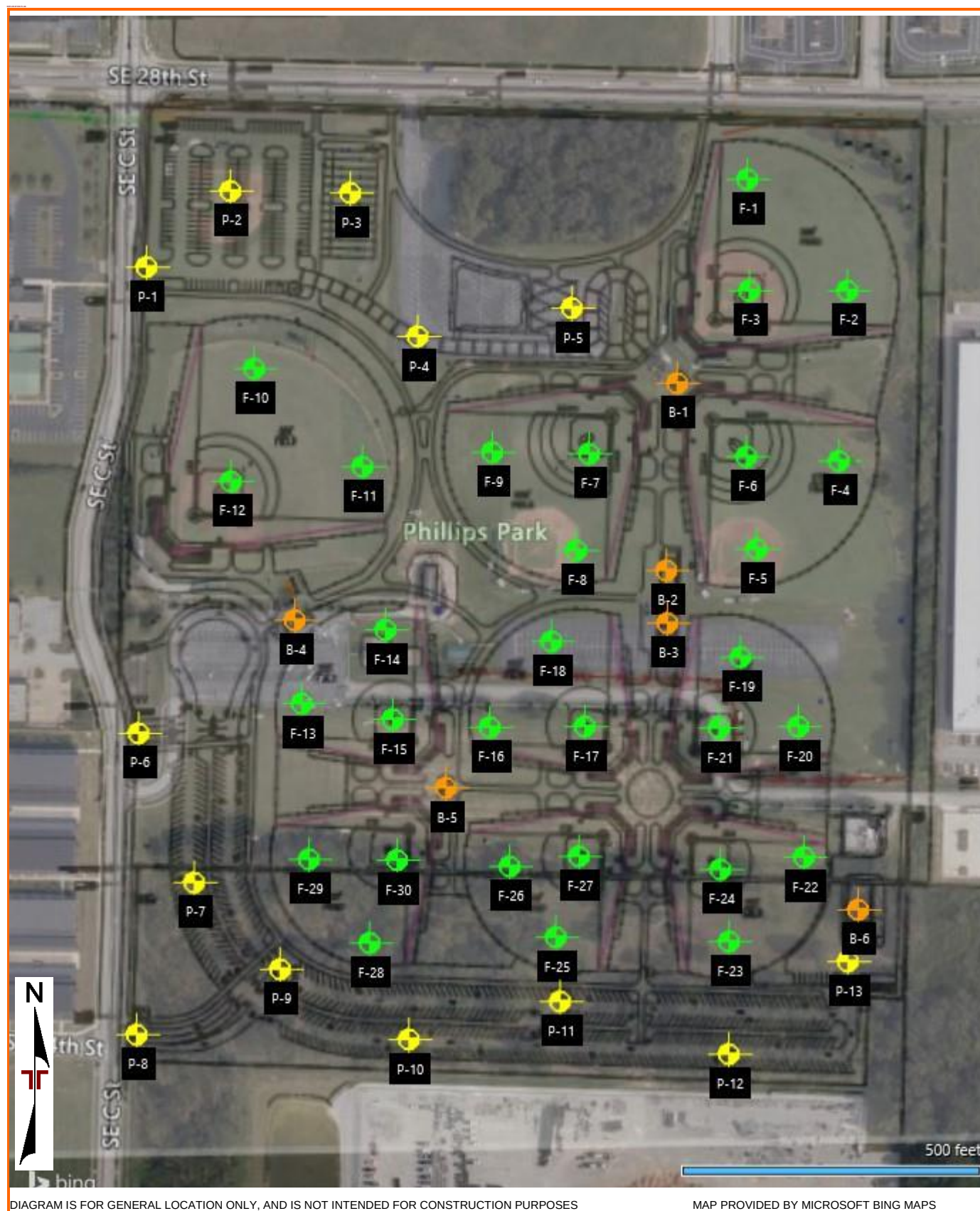


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

## **EXPLORATION RESULTS**

### **Contents:**

Boring Logs (B-1 through B-6, F-1 through F-30, and P-1 through P-13)

Note: All attachments are one page unless noted above.

# BORING LOG NO. B-1

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3413° Longitude: -94.2033° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           |             | 0.3 <b>TOPSOIL</b>                                                                       |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , dark brownish red with gray, medium stiff                        |             |                          |             | 5-7-10<br>N=17     | 16.7              |                              |               |
|             |             |                                                                                          |             |                          |             | 5-4-4<br>N=8       | 19.4              |                              |               |
|             |             |                                                                                          | 5           |                          |             | 5-5-9<br>N=14      | 19.6              | 34-17-17                     | 85            |
|             |             |                                                                                          |             |                          |             | 5-5-8<br>N=13      | 18.0              |                              |               |
| 2           |             | 6.5 <b>LEAN CLAY (CL)</b> , with chert, dark brownish red with gray, very stiff          |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                          | 10          |                          |             | 7-7-45<br>N=52     | 17.5              |                              |               |
|             |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             | 13.8 <b>Boring Terminated at 13.75 Feet</b>                                              |             |                          |             | 50/3"              | 17.5              |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. B-2

Page 1 of 1

PROJECT: Phillips Park Improvements

CLIENT: Crafton Tull & Associates, Inc.  
Rogers, AR

SITE: SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3405° Longitude: -94.2034° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.5         | <b>TOPSOIL</b>                                                                           |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , light brown to dark brown, medium stiff to stiff                 |             |                          |             | 2-1-2<br>N=3       | 19.5              |                              |               |
|             |             |                                                                                          |             |                          |             | 2-2-3<br>N=5       | 22.4              |                              |               |
|             |             |                                                                                          | 5           |                          |             | 4-5-6<br>N=11      | 21.0              | 33-20-13                     | 83            |
|             |             |                                                                                          |             |                          |             | 4-7-13<br>N=20     | 19.7              |                              |               |
|             |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                          | 10          |                          |             | 5-6-9<br>N=15      | 23.8              |                              |               |
|             |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                          |             |                          |             | 13-16-18<br>N=34   | 25.5              |                              |               |
|             |             |                                                                                          | 15          |                          |             |                    |                   |                              |               |
|             |             | <b>Boring Terminated at 15 Feet</b>                                                      |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

# BORING LOG NO. B-3

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3402° Longitude: -94.2034° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.3<br>0.5  | <b>ASPHALT</b>                                                                           |             |                          |             |                    |                   |                              |               |
|             |             | <b>AGGREGATE BASE COURSE</b>                                                             |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , dark brown to light brown, medium stiff to stiff                 |             |                          |             | 4-2-2<br>N=4       | 16.4              |                              |               |
|             |             |                                                                                          |             |                          |             | 2-2-4<br>N=6       | 22.5              |                              |               |
|             |             |                                                                                          | 5           |                          |             | 2-3-5<br>N=8       | 17.1              |                              | 51            |
|             |             |                                                                                          |             |                          |             | 4-7-10<br>N=17     | 20.1              |                              |               |
|             |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                          | 10          |                          |             | 6-7-7<br>N=14      | 30.3              |                              |               |
|             |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                          |             |                          |             | 11-14-19<br>N=33   | 17.2              |                              |               |
|             |             |                                                                                          | 15          |                          |             |                    |                   |                              |               |
|             |             | <b>Boring Terminated at 15 Feet</b>                                                      |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: CME 45B

Driller: Darius

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. B-4

Page 1 of 1

PROJECT: Phillips Park Improvements

CLIENT: Crafton Tull & Associates, Inc.  
Rogers, AR

SITE: SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3402° Longitude: -94.2055° | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|---------------------------------|---------------|
| 1           | 0.3<br>0.5  | <b>ASPHALT</b>                                                                           |             |                             |             |                       |                      |                                 |               |
|             |             | <b>AGGREGATE BASE COURSE</b>                                                             |             |                             |             |                       |                      |                                 |               |
|             |             | <b>LEAN CLAY (CL)</b> , with chert, dark brown to light brownish red, medium dense       |             |                             |             | 5-5-7<br>N=12         | 17.1                 |                                 |               |
|             |             |                                                                                          |             |                             |             | 6-9-7<br>N=16         | 18.3                 |                                 |               |
|             |             |                                                                                          | 5           |                             |             | 6-7-9<br>N=16         | 20.9                 | 38-16-22                        | 53            |
|             |             |                                                                                          |             |                             |             | 6-8-13<br>N=21        | 22.6                 |                                 |               |
| 2           |             |                                                                                          |             |                             |             |                       |                      |                                 |               |
|             |             |                                                                                          | 10          |                             |             | 12-9-8<br>N=17        | 17.3                 |                                 |               |
|             |             |                                                                                          |             |                             |             |                       |                      |                                 |               |
|             |             |                                                                                          |             |                             |             | 7-7-9<br>N=16         | 17.8                 |                                 |               |
|             |             |                                                                                          | 15          |                             |             |                       |                      |                                 |               |
|             |             | <b>Boring Terminated at 15 Feet</b>                                                      |             |                             |             |                       |                      |                                 |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

# BORING LOG NO. B-5

Page 1 of 1

PROJECT: Phillips Park Improvements

CLIENT: Crafton Tull & Associates, Inc.  
Rogers, AR

SITE: SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3395° Longitude: -94.2046° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           |             | 0.3 <b>TOPSOIL</b>                                                                       |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , light reddish brown some gray, medium stiff                      |             |                          |             | 9-11-9<br>N=20     | 10.1              |                              |               |
|             |             |                                                                                          |             |                          |             | 8-9-12<br>N=21     | 13.6              |                              |               |
|             |             |                                                                                          | 5           |                          |             | 5-6-7<br>N=13      | 19.0              | 36-16-20                     | 83            |
|             |             |                                                                                          |             |                          |             | 5-6-11<br>N=17     | 17.6              |                              |               |
| 2           |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             | 10.5 <b>LEAN CLAY (CL)</b> , with chert, dark reddish brown, moist, very stiff           | 10          |                          |             | 5-7-8<br>N=15      | 21.6              |                              |               |
|             |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             | 14.8 <b>Boring Terminated at 14.833 Feet</b>                                             |             |                          |             | 27-13-50/4"        | 23.5              |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. B-6

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3389° Longitude: -94.2023°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|---------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                                 |               |
|             |                                                                                   | <b>LEAN CLAY (CL)</b> , dark brown to light brownish gray, soft to medium stiff                       |             |                             |             | 1-2-3<br>N=5          | 19.4                 |                                 |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 5-8-9<br>N=17         | 17.4                 |                                 |               |
|             |                                                                                   |                                                                                                       | 5           |                             |             | 4-6-8<br>N=14         | 18.8                 | 39-15-24                        | 84            |
|             |                                                                                   |                                                                                                       |             |                             |             | 4-8-12<br>N=20        | 18.8                 |                                 |               |
| 2           |  |                                                                                                       |             |                             |             | 4-6-8<br>N=14         | 19.9                 |                                 |               |
|             |                                                                                   | 13.5 <b>LEAN CLAY (CL)</b> , dark brown to light brownish gray, stiff                                 |             |                             |             | 8-20-18<br>N=38       | 20.3                 |                                 |               |
|             |                                                                                   | 15.0 <b>Boring Terminated at 15 Feet</b>                                                              | 15          |                             |             |                       |                      |                                 |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22



# BORING LOG NO. F-1

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3423° Longitude: -94.2029°<br><br>DEPTH                      | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                                         |             |                          |             |                    |                   |                              |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , some sand, light reddish brown to dark reddish brown, medium stiff, some sandstone @ 3.5 to 5 feet | 5           |                          |             | 3-5-5<br>N=10      | 18.9              |                              |               |
|             |                                                                                   |                                                                                                                            |             |                          |             | 5-8-11<br>N=19     | 16.7              | 41-17-24                     |               |
|             |                                                                                   |                                                                                                                            |             |                          |             | 4-8-6<br>N=14      | 11.3              |                              |               |
|             |                                                                                   |                                                                                                                            |             |                          |             | 6-8-14<br>N=22     | 25.3              |                              |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                                       |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

## BORING LOG NO. F-2

Page 1 of 1

PROJECT: Phillips Park Improvements

CLIENT: Crafton Tull & Associates, Inc.  
Rogers, ARSITE: SE 28th Street  
Bentonville, AR

| MODEL LAYER                                                                                          | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3418° Longitude: -94.2023°<br><br>DEPTH | DEPTH (Ft.)                                                                                                                                                                                                                                    | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE                | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%)         | ATTERBERG<br>LIMITS | PERCENT FINES |
|------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------------------------|-----------------------|------------------------------|---------------------|---------------|
|                                                                                                      |             |                                                                                                       |                                                                                                                                                                                                                                                |                             |                            |                       |                              | LL-PL-PI            |               |
| 1                                                                                                    |             | 0.5 <b>TOPSOIL</b>                                                                                    |                                                                                                                                                                                                                                                |                             |                            |                       |                              |                     |               |
| 2                                                                                                    |             | <b>LEAN CLAY (CL)</b> , dark brown to dark reddish brown, soft to medium stiff                        | 5                                                                                                                                                                                                                                              |                             |                            | 1-2-6<br>N=8          | 19.5                         |                     |               |
|                                                                                                      |             |                                                                                                       |                                                                                                                                                                                                                                                |                             |                            | 4-3-3<br>N=6          | 23.2                         |                     |               |
|                                                                                                      |             |                                                                                                       |                                                                                                                                                                                                                                                |                             |                            | 2-2-4<br>N=6          | 22.6                         |                     |               |
|                                                                                                      |             |                                                                                                       |                                                                                                                                                                                                                                                |                             |                            | 4-5-7<br>N=12         | 20.7                         |                     |               |
| <b>Boring Terminated at 6.5 Feet</b>                                                                 |             |                                                                                                       |                                                                                                                                                                                                                                                |                             |                            |                       |                              |                     |               |
| Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic |             |                                                                                                       |                                                                                                                                                                                                                                                |                             |                            |                       |                              |                     |               |
| Advancement Method:<br>Solid-stem auger                                                              |             |                                                                                                       | See <a href="#">Exploration and Testing Procedures</a> for a description of field and laboratory procedures used and additional data (If any).<br><br>See <a href="#">Supporting Information</a> for explanation of symbols and abbreviations. |                             |                            | Notes:                |                              |                     |               |
| Abandonment Method:<br>Boring backfilled with auger cuttings upon completion.                        |             |                                                                                                       |                                                                                                                                                                                                                                                |                             |                            |                       |                              |                     |               |
| <b>WATER LEVEL OBSERVATIONS</b><br><br><i>No free water observed</i>                                 |             |                                                                                                       | <br>113 S Dixieland Rd<br>Rogers, AR                                                                                                                        |                             | Boring Started: 08-01-2022 |                       | Boring Completed: 08-01-2022 |                     |               |
| Drill Rig: D-50 truck                                                                                |             | Driller: Brooks                                                                                       |                                                                                                                                                                                                                                                |                             |                            |                       |                              |                     |               |
| Project No.: KB225005                                                                                |             |                                                                                                       |                                                                                                                                                                                                                                                |                             |                            |                       |                              |                     |               |

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

## BORING LOG NO. F-3

Page 1 of 1

PROJECT: Phillips Park Improvements

CLIENT: Crafton Tull & Associates, Inc.  
Rogers, ARSITE: SE 28th Street  
Bentonville, AR

| MODEL LAYER                                                                   | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3418° Longitude: -94.2029°<br><br>DEPTH | DEPTH (Ft.)                                                                                                                                    | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS      | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS          | PERCENT FINES |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------|----------------------------|----------------------|------------------------------|---------------|
|                                                                               |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             |                            |                      | LL-PL-PI                     |               |
| 1                                                                             |  | 0.5 <b>TOPSOIL</b>                                                                                    |                                                                                                                                                |                             |             |                            |                      |                              |               |
| 2                                                                             |  | <b>LEAN CLAY (CL)</b> , light reddish brown to dark reddish brown, medium stiff                       |                                                                                                                                                |                             |             | 4-4-10<br>N=14             | 15.1                 |                              |               |
|                                                                               |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | 7-6-7<br>N=13              | 14.7                 |                              |               |
|                                                                               |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | 3-4-4<br>N=8               | 20.8                 |                              |               |
|                                                                               |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | 3-4-5<br>N=9               | 23.1                 |                              |               |
|                                                                               |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |                                                                                                                                                |                             |             |                            |                      |                              |               |
| Stratification lines are approximate. In-situ, the transition may be gradual. |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             |                            |                      |                              |               |
| Hammer Type: Automatic                                                        |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             |                            |                      |                              |               |
| Advancement Method:<br>Solid-stem auger                                       |                                                                                   |                                                                                                       | See <a href="#">Exploration and Testing Procedures</a> for a description of field and laboratory procedures used and additional data (If any). |                             |             | Notes:                     |                      |                              |               |
| Abandonment Method:<br>Boring backfilled with auger cuttings upon completion. |                                                                                   |                                                                                                       | See <a href="#">Supporting Information</a> for explanation of symbols and abbreviations.                                                       |                             |             |                            |                      |                              |               |
| <b>WATER LEVEL OBSERVATIONS</b><br><i>No free water observed</i>              |                                                                                   |                                                                                                       | <br>113 S Dixieland Rd<br>Rogers, AR                        |                             |             | Boring Started: 08-01-2022 |                      | Boring Completed: 08-01-2022 |               |
|                                                                               |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | Drill Rig: D-50 truck      |                      | Driller: Brooks              |               |
|                                                                               |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | Project No.: KB225005      |                      |                              |               |

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

## BORING LOG NO. F-4

Page 1 of 1

PROJECT: Phillips Park Improvements

CLIENT: Crafton Tull & Associates, Inc.  
Rogers, ARSITE: SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3410° Longitude: -94.2024°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS | PERCENT FINES |
|-------------|-------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|---------------------|---------------|
|             |             |                                                                                                       |             |                             |             |                       |                      | LL-PL-PI            |               |
| 1           |             | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                     |               |
| 2           |             | <b>LEAN CLAY (CL)</b> , light brown to light reddish brown, soft to medium stiff                      |             |                             |             | 1-2-3<br>N=5          | 20.2                 |                     |               |
|             |             |                                                                                                       |             |                             |             | 3-6-6<br>N=12         | 19.2                 |                     |               |
|             |             |                                                                                                       |             |                             |             | 4-7-10<br>N=17        | 20.5                 |                     |               |
|             |             | 5.0 <b>LEAN CLAY (CL)</b> , with weathered sandstone, light brown to dark reddish brown, medium stiff | 5           |                             |             | 6-14-11<br>N=25       | 18.7                 |                     |               |
|             |             | 6.5 <b>Boring Terminated at 6.5 Feet</b>                                                              |             |                             |             |                       |                      |                     |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem augerSee [Exploration and Testing Procedures](#) for a  
description of field and laboratory procedures  
used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.See [Supporting Information](#) for explanation of  
symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. F-5

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3406° Longitude: -94.2029°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br><br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|-------------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                                     |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , dark reddish brown, medium stiff                                              | 5           |                             |             | 3-4-7<br>N=11         | 14.0                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 7-7-8<br>N=15         | 13.7                 | 47-18-29                            |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 4-5-6<br>N=11         | 18.5                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 5-6-7<br>N=13         | 21.0                 |                                     |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                             |             |                       |                      |                                     |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

# BORING LOG NO. F-6

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3410° Longitude: -94.2029°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br><br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|-------------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                                     |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , light reddish brown to dark reddish brown, medium stiff                       | 5           |                             |             | 3-4-9<br>N=13         | 17.7                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 5-5-7<br>N=12         | 18.1                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 4-6-6<br>N=12         | 20.2                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 5-8-9<br>N=17         | 18.2                 |                                     |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                             |             |                       |                      |                                     |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

# BORING LOG NO. F-7

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3410° Longitude: -94.2038° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                       |             |                          |             |                    |                   |                              |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , ligh brown to dark reddish brown, soft to medium stiff           | 5           |                          |             | 3-4-4<br>N=8       | 15.3              |                              |               |
|             |                                                                                   |                                                                                          |             |                          |             | 4-4-5<br>N=9       | 18.2              |                              |               |
|             |                                                                                   |                                                                                          |             |                          |             | 4-5-7<br>N=12      | 17.8              |                              |               |
|             |                                                                                   |                                                                                          |             |                          |             | 4-7-8<br>N=15      | 18.0              |                              |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                     |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

# BORING LOG NO. F-8

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**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3406° Longitude: -94.2039° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.5         | <b>TOPSOIL</b>                                                                           |             |                          |             |                    |                   |                              |               |
| 2           | 6.5         | <b>LEAN CLAY (CL)</b> , dark brown to dark reddish brown, soft to medium stiff           | 5           |                          |             | 2-2-4<br>N=6       | 18.2              |                              |               |
|             |             |                                                                                          |             |                          |             | 3-3-6<br>N=9       | 17.0              |                              |               |
|             |             |                                                                                          |             |                          |             | 3-6-7<br>N=13      | 17.2              |                              |               |
|             |             |                                                                                          |             |                          |             | 4-7-9<br>N=16      | 18.1              |                              |               |
|             |             | <b>Boring Terminated at 6.5 Feet</b>                                                     |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005



## BORING LOG NO. F-9

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PROJECT: Phillips Park Improvements

CLIENT: Crafton Tull & Associates, Inc.  
Rogers, ARSITE: SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3410° Longitude: -94.2044°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS | PERCENT FINES |
|-------------|-------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|---------------------|---------------|
|             |             |                                                                                                       |             |                             |             |                       |                      | LL-PL-PI            |               |
| 1           |             | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                     |               |
|             |             | <b>LEAN CLAY (CL)</b> , dark brownish gray to dark reddish gray, medium stiff                         |             |                             |             | 4-5-12<br>N=17        | 9.9                  |                     |               |
|             |             |                                                                                                       |             |                             |             | 13-13-14<br>N=27      | 11.7                 | 42-15-27            |               |
| 2           |             |                                                                                                       |             |                             |             | 7-8-13<br>N=21        | 17.8                 |                     |               |
|             |             |                                                                                                       | 5           |                             |             | 5-5-6<br>N=11         | 23.8                 |                     |               |
|             |             | 6.5                                                                                                   |             |                             |             |                       |                      |                     |               |
|             |             | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                             |             |                       |                      |                     |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem augerSee [Exploration and Testing Procedures](#) for a  
description of field and laboratory procedures  
used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.See [Supporting Information](#) for explanation of  
symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. F-10

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**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3414° Longitude: -94.2057°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br><br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|-------------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                                     |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , light brown to dark reddish brown, medium stiff, moist @<br>5 ft - 6.5 ft     | 5           |                             |             | 2-3-5<br>N=8          | 14.8                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 5-7-9<br>N=16         | 18.9                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 5-7-8<br>N=15         | 15.8                 |                                     | 84            |
|             |                                                                                   |                                                                                                       |             |                             |             | 4-5-6<br>N=11         | 30.2                 |                                     |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                             |             |                       |                      |                                     |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a  
description of field and laboratory procedures  
used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of  
symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

## BORING LOG NO. F-11

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PROJECT: Phillips Park Improvements

CLIENT: Crafton Tull & Associates, Inc.  
Rogers, ARSITE: SE 28th Street  
Bentonville, AR

| MODEL LAYER                                                                                          | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3410° Longitude: -94.2051°<br>DEPTH                                              | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS        | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br>LL-PL-PI | PERCENT FINES |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|------------------------------|----------------------|---------------------------------|---------------|
| 1                                                                                                    |  | 0.5 <b>TOPSOIL</b>                                                                                                                             |             |                             |             |                              |                      |                                 |               |
| 2                                                                                                    |  | <b>LEAN CLAY</b> , light reddish brown to dark reddish brown, medium stiff                                                                     | 5           |                             |             | 3-4-7<br>N=11                | 17.5                 | 44-18-26                        |               |
|                                                                                                      |                                                                                   |                                                                                                                                                |             |                             |             | 6-6-7<br>N=13                | 17.4                 |                                 |               |
|                                                                                                      |                                                                                   |                                                                                                                                                |             |                             |             | 6-7-9<br>N=16                | 20.3                 |                                 |               |
|                                                                                                      |                                                                                   |                                                                                                                                                |             |                             |             | 5-4-4<br>N=8                 | 18.2                 |                                 |               |
|                                                                                                      |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                                                           |             |                             |             |                              |                      |                                 |               |
| Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic |                                                                                   |                                                                                                                                                |             |                             |             |                              |                      |                                 |               |
| Advancement Method:<br>Solid-stem auger                                                              |                                                                                   | See <a href="#">Exploration and Testing Procedures</a> for a description of field and laboratory procedures used and additional data (If any). |             | Notes:                      |             |                              |                      |                                 |               |
| Abandonment Method:<br>Boring backfilled with auger cuttings upon completion.                        |                                                                                   | See <a href="#">Supporting Information</a> for explanation of symbols and abbreviations.                                                       |             |                             |             |                              |                      |                                 |               |
| <b>WATER LEVEL OBSERVATIONS</b><br><i>No free water observed</i>                                     |                                                                                   | <br>113 S Dixieland Rd<br>Rogers, AR                        |             | Boring Started: 08-01-2022  |             | Boring Completed: 08-01-2022 |                      |                                 |               |
|                                                                                                      |                                                                                   |                                                                                                                                                |             | Drill Rig: D-50 truck       |             | Driller: Brooks              |                      |                                 |               |
|                                                                                                      |                                                                                   |                                                                                                                                                |             | Project No.: KB225005       |             |                              |                      |                                 |               |

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. F-12

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3409° Longitude: -94.2058°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br><br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|-------------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                                     |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , light brown to light reddish brown, soft to medium stiff                      |             |                             |             | 2-2-4<br>N=6          | 20.2                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 5-5-7<br>N=12         | 17.8                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 3-6-6<br>N=12         | 18.7                 |                                     |               |
|             |                                                                                   | 5.0 <b>LEAN CLAY (CL)</b> , with sandstone, light red to dark red, medium stiff                       | 5           |                             |             | 15-10-9<br>N=19       | 13.0                 |                                     |               |
|             |                                                                                   | 6.5                                                                                                   |             |                             |             |                       |                      |                                     |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                             |             |                       |                      |                                     |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-01-2022

Boring Completed: 08-01-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

# BORING LOG NO. F-13

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3399° Longitude: -94.2054° | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|---------------------------------|---------------|
| 1           | 0.3         | <b>ASPHALT</b>                                                                           |             |                             |             |                       |                      |                                 |               |
|             | 0.5         | <b>AGGREGATE BASE COURSE</b>                                                             |             |                             |             |                       |                      |                                 |               |
|             |             | <b>LEAN CLAY (CL)</b> , trace sand, light reddish brown, medium stiff                    |             |                             |             | 4-3-6<br>N=9          | 18.8                 |                                 |               |
| 2           |             |                                                                                          |             |                             |             | 4-5-7<br>N=12         | 17.7                 |                                 |               |
|             |             |                                                                                          |             |                             |             | 4-7-8<br>N=15         | 15.1                 |                                 |               |
|             |             |                                                                                          | 5           |                             |             | 4-6-7<br>N=13         | 22.1                 |                                 |               |
|             | 6.5         | <b>Boring Terminated at 6.5 Feet</b>                                                     |             |                             |             |                       |                      |                                 |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: CME 45B

Driller: Darius

Project No.: KB225005

# BORING LOG NO. F-14

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3402° Longitude: -94.2050° | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|---------------------------------|---------------|
| 1           | 0.3<br>0.5  | <b>ASPHALT</b>                                                                           |             |                             |             |                       |                      |                                 |               |
|             |             | <b>AGGREGATE BASE COURSE</b>                                                             |             |                             |             |                       |                      |                                 |               |
|             |             | <b>LEAN CLAY (CL)</b> , trace sand, drk reddish brown, medium stiff                      |             |                             |             | 13-13-12<br>N=25      | 20.6                 |                                 |               |
| 2           |             |                                                                                          |             |                             |             | 5-7-8<br>N=15         | 18.0                 |                                 |               |
|             |             |                                                                                          |             |                             |             | 4-4-10<br>N=14        | 11.5                 |                                 |               |
|             |             |                                                                                          |             |                             |             | 7-7-10<br>N=17        | 18.8                 |                                 |               |
|             | 6.5         | <b>Boring Terminated at 6.5 Feet</b>                                                     |             |                             |             |                       |                      |                                 |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: CME 45B

Driller: Darius

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. F-15

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3398° Longitude: -94.2049°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br><br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|-------------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                                     |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , trace sand, reddish brown, soft to medium stiff                               | 5           |                             |             | 2-2-5<br>N=7          | 16.7                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 6-6-9<br>N=15         | 19.4                 | 41-17-24                            |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 3-3-9<br>N=12         | 18.2                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 4-7-9<br>N=16         | 18.1                 |                                     |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                             |             |                       |                      |                                     |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: CME 45B

Driller: Darius

Project No.: KB225005

## Page 1 of 1

**CLIENT: Crafton Tull & Associates, Inc.  
Rogers, AR**

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br><br>Latitude: 36.3398° Longitude: -94.2044° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------|---------------|
|             |                                                                                   |                                                                                              |             |                          |             |                    |                   | LL-PL-PI         |               |
| 1           |  | DEPTH<br>0.5 <b>TOPSOIL</b>                                                                  |             |                          |             |                    |                   |                  |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , trace sand, dark brown to dark reddish gray, medium stiff            |             |                          |             | 4-4-8<br>N=12      | 15.1              |                  |               |
|             |                                                                                   |                                                                                              |             |                          |             | 6-6-7<br>N=13      | 17.6              |                  |               |
|             |                                                                                   |                                                                                              |             |                          |             | 4-6-7<br>N=13      | 16.0              |                  |               |
|             |                                                                                   |                                                                                              |             |                          |             | 5-5-9<br>N=14      | 20.1              |                  |               |
|             |                                                                                   |                                                                                              |             |                          |             |                    |                   |                  |               |
|             |                                                                                   |                                                                                              |             |                          |             | 8-6-10<br>N=16     | 23.0              |                  |               |
|             |                                                                                   | 10.0<br><b>Boring Terminated at 10 Feet</b>                                                  | 10          |                          |             |                    |                   |                  |               |

Hammer Type: Automatic

Project No.: KB225005



# BORING LOG NO. F-17

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3398° Longitude: -94.2038°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                          |             |                    |                   |                              |               |
|             |                                                                                   | <b>LEAN CLAY (CL)</b> , trace sand, light brown to dark brown, soft to medium stiff                   |             |                          |             | 2-5-10<br>N=15     | 37.0              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 4-4-8<br>N=12      | 11.7              | 26-14-12                     |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 4-3-2<br>N=5       | 11.9              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 4-4-5<br>N=9       | 20.9              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             |                    |                   |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 6-6-4<br>N=10      | 17.4              |                              |               |
| 2           |  | 10.0 <b>Boring Terminated at 10 Feet</b>                                                              | 10          |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: CME 45B

Driller: Darius

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. F-18

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3402° Longitude: -94.2040° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.6         | <b>ASPHALT</b>                                                                           |             |                          |             |                    |                   |                              |               |
|             | 1.0         | <b>AGGREGATE BASE COURSE</b>                                                             |             |                          |             |                    |                   |                              |               |
| 2           |             | <b>LEAN CLAY (CL)</b> , dark reddish gray to dark brownish gray, soft to medium stiff    | 5           |                          |             | 6-3-2<br>N=5       | 22.9              |                              |               |
|             |             |                                                                                          |             |                          |             | 3-4-5<br>N=9       | 19.0              |                              |               |
|             |             |                                                                                          |             |                          |             | 3-5-7<br>N=12      | 11.4              |                              |               |
|             |             |                                                                                          |             |                          |             | 7-4-5<br>N=9       | 18.4              |                              |               |
|             |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                          |             |                          |             | 7-6-7<br>N=13      | 14.6              |                              |               |
|             | 10.0        | <b>Boring Terminated at 10 Feet</b>                                                      | 10          |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: CME 45B

Driller: Darius

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22



# BORING LOG NO. F-20

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3398° Longitude: -94.2026° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.5         | <b>TOPSOIL</b>                                                                           |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , light reddish brown to dark reddish gray, medium stiff           |             |                          |             | 2-3-5<br>N=8       | 17.1              |                              |               |
|             |             |                                                                                          |             |                          |             | 5-5-6<br>N=11      | 18.2              |                              |               |
| 2           |             |                                                                                          | 5           |                          |             | 4-6-7<br>N=13      | 19.1              | 34-19-15                     | 82            |
|             |             |                                                                                          |             |                          |             | 5-6-7<br>N=13      | 17.3              |                              |               |
|             |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                          |             |                          |             | 5-7-9<br>N=16      | 22.2              |                              |               |
|             | 10.0        | <b>Boring Terminated at 10 Feet</b>                                                      | 10          |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

# BORING LOG NO. F-21

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3398° Longitude: -94.2031° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.3<br>0.5  | <b>ASPHALT</b>                                                                           |             |                          |             |                    |                   |                              |               |
|             |             | <b>AGGREGATE BASE COURSE</b>                                                             |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , trace sand, dark reddish brown, soft to medium stiff             |             |                          |             |                    |                   |                              |               |
| 2           |             |                                                                                          | 5           |                          |             | 3-3-4<br>N=7       | 22.4              |                              |               |
|             |             |                                                                                          |             |                          |             | 3-4-5<br>N=9       | 21.4              | 37-18-19                     |               |
|             |             |                                                                                          |             |                          |             | 3-3-5<br>N=8       | 20.0              |                              |               |
|             |             |                                                                                          |             |                          |             | 5-6-7<br>N=13      | 16.3              |                              |               |
|             |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                          |             |                          |             | 4-6-5<br>N=11      | 27.2              |                              |               |
|             |             |                                                                                          | 10          |                          |             |                    |                   |                              |               |
|             |             | <b>Boring Terminated at 10 Feet</b>                                                      |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: CME 45B

Driller: Darius

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

## Page 1 of 1

**CLIENT: Crafton Tull & Associates, Inc.  
Rogers, AR**

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br><br>Latitude: 36.3392° Longitude: -94.2026° | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS | PERCENT FINES |
|-------------|-------------|----------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|---------------------|---------------|
|             |             |                                                                                              |             |                             |             |                       |                      | LL-PL-PI            |               |
| 1           |             | DEPTH<br>0.5 <b>TOPSOIL</b>                                                                  |             |                             |             |                       |                      |                     |               |
| 2           |             | <b>LEAN CLAY (CL)</b> , light brownish gray to dark reddish gray, medium stiff               |             |                             | X           | 2-2-4<br>N=6          | 19.4                 |                     |               |
|             |             |                                                                                              |             |                             | X           | 6-6-9<br>N=15         | 19.3                 |                     |               |
|             |             |                                                                                              |             |                             | X           | 5-6-7<br>N=13         | 20.0                 |                     |               |
|             |             |                                                                                              |             |                             | X           | 5-9-12<br>N=21        | 20.2                 |                     |               |
|             |             |                                                                                              |             |                             |             |                       |                      |                     |               |
|             |             |                                                                                              |             |                             | X           | 4-6-7<br>N=13         | 19.0                 |                     |               |
|             |             | <b>Boring Terminated at 10 Feet</b>                                                          | 10          |                             |             |                       |                      |                     |               |

Hammer Type: Automatic

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Project No.: KB225005

# BORING LOG NO. F-23

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3388° Longitude: -94.2030°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                          |             |                    |                   |                              |               |
|             |                                                                                   | <b>LEAN CLAY (CL)</b> , light brown to dark reddish brown, medium stiff                               |             |                          |             | 1-1-1<br>N=2       | 20.5              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 5-6-7<br>N=13      | 18.7              | 35-19-16                     |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 5-6-8<br>N=14      | 18.7              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 5-9-10<br>N=19     | 18.0              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             |                    |                   |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 5-8-8<br>N=16      | 21.8              |                              |               |
| 2           |  | 10.0 <b>Boring Terminated at 10 Feet</b>                                                              | 10          |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

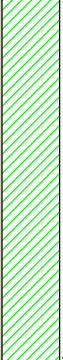
# BORING LOG NO. F-24

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3391° Longitude: -94.2031°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                          |             |                    |                   |                              |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , light brown to light brownish gray, medium stiff to stiff                     | 5           |                          |             | 0-0-3<br>N=3       | 22.5              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 4-6-7<br>N=13      | 17.5              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 4-7-9<br>N=16      | 18.2              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 4-7-13<br>N=20     | 23.9              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             |                    |                   |                              |               |
|             |                                                                                   | <b>Boring Terminated at 8.5 Feet</b>                                                                  |             |                          |             | 50/0"              | 14.1              |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005



# BORING LOG NO. F-25

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3388° Longitude: -94.2040° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           |             | 0.5 <b>TOPSOIL</b>                                                                       |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , light brown to dark reddish brown, soft                          |             |                          |             | 1-2-4<br>N=6       | 19.3              |                              |               |
|             |             |                                                                                          |             |                          |             | 4-4-6<br>N=10      | 19.8              | 37-19-18                     |               |
| 2           |             | 6.5                                                                                      |             |                          |             | 2-2-9<br>N=11      | 20.9              |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , with chert, dark reddish brown, stiff                            |             |                          |             | 9-13-8<br>N=21     | 17.7              |                              |               |
|             |             | 8.6                                                                                      |             |                          |             |                    |                   |                              |               |
|             |             | <b>Boring Terminated at 8.583 Feet</b>                                                   |             |                          |             | 50/1"              | 19.7              |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

## Page 1 of 1

**CLIENT: Crafton Tull & Associates, Inc.  
Rogers, AR**

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3391° Longitude: -94.2043° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------|---------------|
|             |                                                                                   |                                                                                          |             |                          |             |                    |                   | LL-PL-PI         |               |
| 1           |  | DEPTH<br>0.5 <b>TOPSOIL</b>                                                              |             |                          |             |                    |                   |                  |               |
| 2           |  | 2.0 <b>LEAN CLAY (CL)</b> , dark brown to dark reddish gray, very soft                   |             |                          | X           | 2-1-1<br>N=2       | 21.5              |                  |               |
|             |                                                                                   | 2.0 <b>LEAN CLAY (CL)</b> , dark brown to dark reddish gray, medium stiff                |             |                          | X           | 8-7-8<br>N=15      | 15.4              |                  |               |
|             |                                                                                   |                                                                                          |             |                          | X           | 8-8-9<br>N=17      | 12.9              |                  |               |
|             |                                                                                   |                                                                                          |             |                          | X           | 7-10-12<br>N=22    | 17.9              |                  |               |
|             |                                                                                   | 10.0                                                                                     |             |                          | X           | 13-13-11<br>N=24   | 17.6              |                  |               |
|             |                                                                                   | <b>Boring Terminated at 10 Feet</b>                                                      | 10          |                          |             |                    |                   |                  |               |

Hammer Type: Automatic

Project No.: KB225005

# BORING LOG NO. F-27

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3392° Longitude: -94.2039°   | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|--------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.5         | <b>TOPSOIL</b>                                                                             |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , dark reddish gray to light brownish gray, very soft                |             |                          |             | 2-1-2<br>N=3       | 20.1              |                              |               |
|             | 2.0         | <b>LEAN CLAY (CL)</b> , some chert, dark reddish gray to light brownish gray, medium stiff |             |                          |             | 4-5-8<br>N=13      | 17.7              |                              |               |
| 2           |             |                                                                                            | 5           |                          |             | 4-9-15<br>N=24     | 19.2              |                              |               |
|             |             |                                                                                            |             |                          |             | 7-9-9<br>N=18      | 18.1              |                              |               |
|             |             |                                                                                            |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                            |             |                          |             | 7-11-12<br>N=23    | 16.9              |                              |               |
|             | 10.0        | <b>Boring Terminated at 10 Feet</b>                                                        | 10          |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. F-28

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3388° Longitude: -94.2051° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.5         | <b>TOPSOIL</b>                                                                           |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , dark reddish brown to dark reddish gray, very soft               |             |                          |             | 1-1-1<br>N=2       | 18.4              |                              |               |
|             | 2.0         | <b>LEAN CLAY (CL)</b> , dark reddish brown to dark reddish gray, medium stiff            |             |                          |             | 3-8-11<br>N=19     | 15.1              |                              |               |
|             |             |                                                                                          |             |                          |             | 6-9-9<br>N=18      | 19.0              |                              |               |
|             |             |                                                                                          |             |                          |             | 9-9-12<br>N=21     | 12.2              |                              |               |
|             |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                          |             |                          |             | 4-5-9<br>N=14      | 21.7              |                              |               |
|             | 10.0        | <b>Boring Terminated at 10 Feet</b>                                                      | 10          |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. F-29

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3392° Longitude: -94.2054° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.5         | <b>TOPSOIL</b>                                                                           |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , light brown to dark reddish brown, very soft                     |             |                          |             | 0-0-0<br>N=0       | 22.3              |                              |               |
|             | 2.0         | <b>LEAN CLAY (CL)</b> , light brown to dark reddish brown, medium stiff to stiff         |             |                          |             | 8-11-11<br>N=22    | 11.9              | 31-18-13                     |               |
| 2           |             |                                                                                          | 5           |                          |             | 9-11-9<br>N=20     | 10.6              |                              |               |
|             |             |                                                                                          |             |                          |             | 7-10-11<br>N=21    | 10.0              |                              |               |
|             |             |                                                                                          |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                          |             |                          |             | 9-12-17<br>N=29    | 20.5              |                              |               |
|             | 10.0        | <b>Boring Terminated at 10 Feet</b>                                                      | 10          |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

# BORING LOG NO. F-30

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3391° Longitude: -94.2049°                                    | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|-----------------------------------------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.5         | <b>TOPSOIL</b>                                                                                                              |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , light brownish gray to dark reddish brown, soft                                                     |             |                          |             | 1-2-2<br>N=4       | 16.8              |                              |               |
|             | 2.0         | <b>LEAN CLAY (CL)</b> , light brownish gray to dark reddish brown, medium stiff                                             |             |                          |             | 7-6-9<br>N=15      | 11.7              |                              |               |
|             |             |                                                                                                                             |             |                          |             | 10-10-12<br>N=22   | 13.6              |                              |               |
| 2           | 5.0         | <b>LEAN CLAY (CL)</b> , light brownish gray to dark reddish brown, stiff to very stiff, weathered sandstone @ 5 ft - 6.5 ft | 5           |                          |             | 8-26-28<br>N=54    | 14.2              |                              |               |
|             |             |                                                                                                                             |             |                          |             |                    |                   |                              |               |
|             |             |                                                                                                                             |             |                          |             | 6-10-13<br>N=23    | 13.0              |                              |               |
|             | 10.0        | <b>Boring Terminated at 10 Feet</b>                                                                                         | 10          |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-02-2022

Boring Completed: 08-02-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

## BORING LOG NO. P-1

Page 1 of 1

PROJECT: Phillips Park Improvements

CLIENT: Crafton Tull & Associates, Inc.  
Rogers, ARSITE: SE 28th Street  
Bentonville, AR

| MODEL LAYER                                                                                          | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3419° Longitude: -94.2063°<br><br>DEPTH | DEPTH (Ft.)                                                                                                                                                                                                                                    | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS      | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS          | PERCENT FINES |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------|----------------------------|----------------------|------------------------------|---------------|
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                                                                                                                |                             |             |                            |                      | LL-PL-PI                     |               |
| 1                                                                                                    |  | 0.5 <b>TOPSOIL</b>                                                                                    |                                                                                                                                                                                                                                                |                             |             |                            |                      |                              |               |
| 2                                                                                                    |  | <b>LEAN CLAY (CL)</b> , light brown to dark brown, medium stiff                                       | 5                                                                                                                                                                                                                                              |                             |             | 8-7-7<br>N=14              | 24.2                 | 35-17-18                     |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                                                                                                                |                             |             | 4-5-6<br>N=11              | 19.4                 |                              |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                                                                                                                |                             |             | 3-3-6<br>N=9               | 17.6                 |                              |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                                                                                                                |                             |             | 4-5-6<br>N=11              | 16.5                 |                              |               |
|                                                                                                      |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |                                                                                                                                                                                                                                                |                             |             |                            |                      |                              |               |
| Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic |                                                                                   |                                                                                                       |                                                                                                                                                                                                                                                |                             |             |                            |                      |                              |               |
| Advancement Method:<br>Solid-stem auger                                                              |                                                                                   |                                                                                                       | See <a href="#">Exploration and Testing Procedures</a> for a description of field and laboratory procedures used and additional data (If any).<br><br>See <a href="#">Supporting Information</a> for explanation of symbols and abbreviations. |                             |             | Notes:                     |                      |                              |               |
| Abandonment Method:<br>Boring backfilled with auger cuttings upon completion.                        |                                                                                   |                                                                                                       |                                                                                                                                                                                                                                                |                             |             |                            |                      |                              |               |
| <b>WATER LEVEL OBSERVATIONS</b>                                                                      |                                                                                   |                                                                                                       | <br>113 S Dixieland Rd<br>Rogers, AR                                                                                                                        |                             |             | Boring Started: 08-03-2022 |                      | Boring Completed: 08-03-2022 |               |
| No free water observed                                                                               |                                                                                   |                                                                                                       |                                                                                                                                                                                                                                                |                             |             | Drill Rig: D-50 truck      |                      | Driller: Brooks              |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                                                                                                                |                             |             | Project No.: KB225005      |                      |                              |               |

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. P-2

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3422° Longitude: -94.2058°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br><br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|-------------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                                     |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , trace sand, dark brown, soft                                                  | 5           |                             |             | 3-3-5<br>N=8          | 14.4                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 3-2-2<br>N=4          | 16.3                 | 32-18-14                            |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 2-2-2<br>N=4          | 18.0                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 0-2-1<br>N=3          | 22.9                 |                                     |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                             |             |                       |                      |                                     |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-03-2022

Boring Completed: 08-03-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005



# BORING LOG NO. P-3

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3422° Longitude: -94.2052°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                          |             |                    |                   |                              |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , trace sand, tannish brown to light brown, soft to medium stiff                | 5           |                          |             | 5-6-5<br>N=11      | 18.0              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 3-3-3<br>N=6       | 21.1              | 26-17-9                      |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 2-2-2<br>N=4       | 16.1              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 2-3-4<br>N=7       | 20.3              |                              |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-03-2022

Boring Completed: 08-03-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

# BORING LOG NO. P-4

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3415° Longitude: -94.2048° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.3<br>0.5  | <b>ASPHALT</b>                                                                           |             |                          |             |                    |                   |                              |               |
|             |             | <b>AGGREGATE BASE COURSE</b>                                                             |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , trace sand, dark brown to reddish brown, medium stiff            |             |                          |             |                    |                   |                              |               |
| 2           | 6.5         |                                                                                          | 5           |                          |             | 4-6-4<br>N=10      | 14.6              |                              |               |
|             |             |                                                                                          |             |                          |             | 4-6-6<br>N=12      | 26.1              | 28-16-12                     | 66            |
|             |             |                                                                                          |             |                          |             | 3-4-5<br>N=9       | 13.9              |                              |               |
|             |             |                                                                                          |             |                          |             | 3-6-10<br>N=16     | 16.6              |                              |               |
|             |             | <b>Boring Terminated at 6.5 Feet</b>                                                     |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-03-2022

Boring Completed: 08-03-2022

Drill Rig: CME 45B

Driller: Darius

Project No.: KB225005

# BORING LOG NO. P-5

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3417° Longitude: -94.2039° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.3<br>0.5  | <b>ASPHALT</b>                                                                           |             |                          |             |                    |                   |                              |               |
|             |             | <b>AGGREGATE BASE COURSE</b>                                                             |             |                          |             |                    |                   |                              |               |
|             |             | <b>LEAN CLAY (CL)</b> , with sand, reddish brown, soft                                   |             |                          |             | 4-5-4<br>N=9       | 14.2              |                              |               |
| 2           |             |                                                                                          |             |                          |             | 3-4-4<br>N=8       | 16.7              | 35-16-19                     |               |
|             |             |                                                                                          |             |                          |             | 2-2-6<br>N=8       | 18.3              |                              |               |
|             |             |                                                                                          |             |                          |             | 2-4-4<br>N=8       | 19.8              |                              |               |
|             | 6.5         | <b>Boring Terminated at 6.5 Feet</b>                                                     |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-03-2022

Boring Completed: 08-03-2022

Drill Rig: CME 45B

Driller: Darius

Project No.: KB225005

# BORING LOG NO. P-6

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3397° Longitude: -94.2064°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br><br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|-------------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                                     |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , trace sand, tannish brown to reddish brown, medium stiff                      | 5           |                             |             | 0-4-7<br>N=11         | 15.6                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 6-6-8<br>N=14         | 17.4                 | 39-16-23                            |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 4-7-5<br>N=12         | 17.4                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 8-8-6<br>N=14         | 16.6                 |                                     |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                             |             |                       |                      |                                     |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-03-2022

Boring Completed: 08-03-2022

Drill Rig: CME 45B

Driller: Darius

Project No.: KB225005

# BORING LOG NO. P-7

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3390° Longitude: -94.2061°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                          |             |                    |                   |                              |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , light brown to light reddish brown, soft to medium stiff                      | 5           |                          |             | 1-1-6<br>N=7       | 16.4              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 7-9-10<br>N=19     | 12.0              | 32-19-13                     |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 10-12-14<br>N=26   | 12.5              |                              |               |
|             |                                                                                   |                                                                                                       |             |                          |             | 4-5-7<br>N=12      | 18.7              |                              |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-03-2022

Boring Completed: 08-03-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

# BORING LOG NO. P-8

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER                            | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3383° Longitude: -94.2064° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|----------------------------------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1                                      | 0.5         | <b>TOPSOIL</b>                                                                           |             |                          |             |                    |                   |                              |               |
|                                        |             | <b>LEAN CLAY (CL)</b> , dark reddish brown, medium stiff to stiff                        |             |                          |             | 1-3-4<br>N=7       | 16.5              |                              |               |
| 2                                      | 3.5         | <b>LEAN CLAY (CL)</b> , with chert, dark reddish brown, very stiff                       |             |                          |             | 8-13-15<br>N=28    | 16.2              | 36-19-17                     | 76            |
|                                        |             |                                                                                          |             |                          |             | 8-40-50/1"         | 16.4              |                              |               |
|                                        | 6.4         |                                                                                          | 5           |                          |             | 11-18-50/5"        | 19.4              |                              |               |
| <b>Boring Terminated at 6.417 Feet</b> |             |                                                                                          |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-03-2022

Boring Completed: 08-03-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

# BORING LOG NO. P-9

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3386° Longitude: -94.2056°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br><br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|-------------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                                     |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , some chert, dark brown to dark reddish brown, soft to medium stiff            | 5           |                             |             | 0-0-4<br>N=4          | 20.0                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 8-8-10<br>N=18        | 20.2                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 4-7-8<br>N=15         | 19.0                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 7-8-14<br>N=22        | 23.8                 |                                     |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                             |             |                       |                      |                                     |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-03-2022

Boring Completed: 08-03-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

## BORING LOG NO. P-10

Page 1 of 1

PROJECT: Phillips Park Improvements

CLIENT: Crafton Tull & Associates, Inc.  
Rogers, ARSITE: SE 28th Street  
Bentonville, AR

| MODEL LAYER                                                                                          | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3383° Longitude: -94.2048°<br><br>DEPTH | DEPTH (Ft.)                                                                                                                                    | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS      | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS          | PERCENT FINES |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------|----------------------------|----------------------|------------------------------|---------------|
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             |                            |                      | LL-PL-PI                     |               |
| 1                                                                                                    |  | 0.5 <b>TOPSOIL</b>                                                                                    |                                                                                                                                                |                             |             |                            |                      |                              |               |
| 2                                                                                                    |  | <b>LEAN CLAY (CL)</b> , dark brown to dark reddish gray, soft to medium stiff                         |                                                                                                                                                |                             |             | 1-2-4<br>N=6               | 17.9                 |                              |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | 6-7-5<br>N=12              | 12.8                 | 34-17-17                     |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | 4-9-15<br>N=24             | 13.4                 |                              |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | 5-6-9<br>N=15              | 24.5                 |                              |               |
|                                                                                                      |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  | 5                                                                                                                                              |                             |             |                            |                      |                              |               |
| Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             |                            |                      |                              |               |
| Advancement Method:<br>Solid-stem auger                                                              |                                                                                   |                                                                                                       | See <a href="#">Exploration and Testing Procedures</a> for a description of field and laboratory procedures used and additional data (If any). |                             |             | Notes:                     |                      |                              |               |
| Abandonment Method:<br>Boring backfilled with auger cuttings upon completion.                        |                                                                                   |                                                                                                       | See <a href="#">Supporting Information</a> for explanation of symbols and abbreviations.                                                       |                             |             |                            |                      |                              |               |
| <b>WATER LEVEL OBSERVATIONS</b><br><i>No free water observed</i>                                     |                                                                                   |                                                                                                       | <br>113 S Dixieland Rd<br>Rogers, AR                        |                             |             | Boring Started: 08-03-2022 |                      | Boring Completed: 08-03-2022 |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | Drill Rig: D-50 truck      |                      | Driller: Brooks              |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | Project No.: KB225005      |                      |                              |               |

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22



# BORING LOG NO. P-11

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3385° Longitude: -94.2040° | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS<br>LL-PL-PI | PERCENT FINES |
|-------------|-------------|------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------|-------------------|------------------------------|---------------|
| 1           | 0.5         | <b>TOPSOIL</b>                                                                           |             |                          |             |                    |                   |                              |               |
| 2           | 5.0         | <b>LEAN CLAY (CL)</b> , light brownish gray, medium stiff                                |             |                          |             | 1-2-9<br>N=11      | 15.4              |                              |               |
|             |             |                                                                                          |             |                          |             | 10-10-11<br>N=21   | 15.2              | 61-17-44                     |               |
|             |             |                                                                                          |             |                          |             | 10-10-13<br>N=23   | 11.5              |                              |               |
|             | 6.5         | <b>LEAN CLAY (CL)</b> , with chert, dark brownish gray, stiff                            | 5           |                          |             | 7-22-23<br>N=45    | 16.2              |                              |               |
|             |             | <b>Boring Terminated at 6.5 Feet</b>                                                     |             |                          |             |                    |                   |                              |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-03-2022

Boring Completed: 08-03-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

# BORING LOG NO. P-12

Page 1 of 1

**PROJECT:** Phillips Park Improvements

**CLIENT:** Crafton Tull & Associates, Inc.  
Rogers, AR

**SITE:** SE 28th Street  
Bentonville, AR

| MODEL LAYER | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3383° Longitude: -94.2030°<br><br>DEPTH | DEPTH (Ft.) | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS<br><br>LL-PL-PI | PERCENT FINES |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-------------|-----------------------|----------------------|-------------------------------------|---------------|
| 1           |  | 0.5 <b>TOPSOIL</b>                                                                                    |             |                             |             |                       |                      |                                     |               |
| 2           |  | <b>LEAN CLAY (CL)</b> , light brownish gray to dark reddish brown, medium stiff                       | 5           |                             |             | 4-5-8<br>N=13         | 16.6                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 6-9-9<br>N=18         | 12.3                 | 47-15-32                            |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 10-13-11<br>N=24      | 13.6                 |                                     |               |
|             |                                                                                   |                                                                                                       |             |                             |             | 6-10-9<br>N=19        | 13.6                 |                                     |               |
|             |                                                                                   | <b>Boring Terminated at 6.5 Feet</b>                                                                  |             |                             |             |                       |                      |                                     |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Solid-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

No free water observed

**Terracon**  
113 S Dixieland Rd  
Rogers, AR

Boring Started: 08-03-2022

Boring Completed: 08-03-2022

Drill Rig: D-50 truck

Driller: Brooks

Project No.: KB225005

## BORING LOG NO. P-13

Page 1 of 1

PROJECT: Phillips Park Improvements

CLIENT: Crafton Tull & Associates, Inc.  
Rogers, ARSITE: SE 28th Street  
Bentonville, AR

| MODEL LAYER                                                                                          | GRAPHIC LOG                                                                       | LOCATION See <a href="#">Exploration Plan</a><br>Latitude: 36.3387° Longitude: -94.2023°<br><br>DEPTH | DEPTH (Ft.)                                                                                                                                    | WATER LEVEL<br>OBSERVATIONS | SAMPLE TYPE | FIELD TEST<br>RESULTS      | WATER<br>CONTENT (%) | ATTERBERG<br>LIMITS          | PERCENT FINES |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------|----------------------------|----------------------|------------------------------|---------------|
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             |                            |                      | LL-PL-PI                     |               |
| 1                                                                                                    |  | 0.5 <b>TOPSOIL</b>                                                                                    | 5                                                                                                                                              |                             |             |                            |                      |                              |               |
| 2                                                                                                    |  | <b>LEAN CLAY (CL)</b> , dark brown to light reddish brown, medium stiff                               |                                                                                                                                                |                             |             | 2-5-10<br>N=15             | 16.0                 |                              |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | 5-6-7<br>N=13              | 19.5                 | 35-19-16                     |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | 5-7-8<br>N=15              | 22.7                 |                              |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | 5-8-10<br>N=18             | 22.3                 |                              |               |
|                                                                                                      |                                                                                   | 6.5 <b>Boring Terminated at 6.5 Feet</b>                                                              |                                                                                                                                                |                             |             |                            |                      |                              |               |
| Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Automatic |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             |                            |                      |                              |               |
| Advancement Method:<br>Solid-stem auger                                                              |                                                                                   |                                                                                                       | See <a href="#">Exploration and Testing Procedures</a> for a description of field and laboratory procedures used and additional data (If any). |                             |             | Notes:                     |                      |                              |               |
| Abandonment Method:<br>Boring backfilled with auger cuttings upon completion.                        |                                                                                   |                                                                                                       | See <a href="#">Supporting Information</a> for explanation of symbols and abbreviations.                                                       |                             |             |                            |                      |                              |               |
| <b>WATER LEVEL OBSERVATIONS</b><br><i>No free water observed</i>                                     |                                                                                   |                                                                                                       | <br>113 S Dixieland Rd<br>Rogers, AR                        |                             |             | Boring Started: 08-03-2022 |                      | Boring Completed: 08-03-2022 |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | Drill Rig: D-50 truck      |                      | Driller: Brooks              |               |
|                                                                                                      |                                                                                   |                                                                                                       |                                                                                                                                                |                             |             | Project No.: KB225005      |                      |                              |               |

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL KB225005 PHILLIPS PARK IMP.GPJ TERRACON\_DATATEMPLATE.GDT 9/1/22

## **SUPPORTING INFORMATION**

### **Contents:**

General Notes

Unified Soil Classification System

Note: All attachments are one page unless noted above.

| Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests <sup>A</sup> |                                                                      |                                                         |                                             |        | Soil Classification               |                                    |
|------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------|--------|-----------------------------------|------------------------------------|
|                                                                                          |                                                                      |                                                         |                                             |        | Group Symbol                      | Group Name <sup>B</sup>            |
| Coarse-Grained Soils:<br>More than 50% retained on No. 200 sieve                         | Gravels:<br>More than 50% of coarse fraction retained on No. 4 sieve | Clean Gravels:<br>Less than 5% fines <sup>C</sup>       | Cu ≥ 4 and 1 ≤ Cc ≤ 3 <sup>E</sup>          | GW     | Well-graded gravel <sup>F</sup>   |                                    |
|                                                                                          |                                                                      |                                                         | Cu < 4 and/or [Cc<1 or Cc>3.0] <sup>E</sup> | GP     | Poorly graded gravel <sup>F</sup> |                                    |
|                                                                                          |                                                                      | Gravels with Fines:<br>More than 12% fines <sup>C</sup> | Fines classify as ML or MH                  | GM     | Silty gravel <sup>F, G, H</sup>   |                                    |
|                                                                                          |                                                                      |                                                         | Fines classify as CL or CH                  | GC     | Clayey gravel <sup>F, G, H</sup>  |                                    |
|                                                                                          | Sands:<br>50% or more of coarse fraction passes No. 4 sieve          | Clean Sands:<br>Less than 5% fines <sup>D</sup>         | Cu ≥ 6 and 1 ≤ Cc ≤ 3 <sup>E</sup>          | SW     | Well-graded sand <sup>I</sup>     |                                    |
|                                                                                          |                                                                      |                                                         | Cu < 6 and/or [Cc<1 or Cc>3.0] <sup>E</sup> | SP     | Poorly graded sand <sup>I</sup>   |                                    |
|                                                                                          |                                                                      | Sands with Fines:<br>More than 12% fines <sup>D</sup>   | Fines classify as ML or MH                  | SM     | Silty sand <sup>G, H, I</sup>     |                                    |
|                                                                                          |                                                                      |                                                         | Fines classify as CL or CH                  | SC     | Clayey sand <sup>G, H, I</sup>    |                                    |
| Fine-Grained Soils:<br>50% or more passes the No. 200 sieve                              | Silts and Clays:<br>Liquid limit less than 50                        | Inorganic:                                              | PI > 7 and plots on or above “A”            | CL     | Lean clay <sup>K, L, M</sup>      |                                    |
|                                                                                          |                                                                      |                                                         | PI < 4 or plots below “A” line <sup>J</sup> | ML     | Silt <sup>K, L, M</sup>           |                                    |
|                                                                                          |                                                                      | Organic:                                                | Liquid limit - oven dried                   | < 0.75 | OL                                | Organic clay <sup>K, L, M, N</sup> |
|                                                                                          |                                                                      |                                                         | Liquid limit - not dried                    |        |                                   | Organic silt <sup>K, L, M, O</sup> |
|                                                                                          | Silts and Clays:<br>Liquid limit 50 or more                          | Inorganic:                                              | PI plots on or above “A” line               | CH     | Fat clay <sup>K, L, M</sup>       |                                    |
|                                                                                          |                                                                      |                                                         | PI plots below “A” line                     | MH     | Elastic Silt <sup>K, L, M</sup>   |                                    |
|                                                                                          |                                                                      | Organic:                                                | Liquid limit - oven dried                   | < 0.75 | OH                                | Organic clay <sup>K, L, M, P</sup> |
|                                                                                          |                                                                      |                                                         | Liquid limit - not dried                    |        |                                   | Organic silt <sup>K, L, M, Q</sup> |
| Highly organic soils:                                                                    | Primarily organic matter, dark in color, and organic odor            |                                                         |                                             | PT     | Peat                              |                                    |

<sup>A</sup> Based on the material passing the 3-inch (75-mm) sieve.

<sup>B</sup> If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

<sup>C</sup> Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

<sup>D</sup> Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

$$^E Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

<sup>F</sup> If soil contains  $\geq 15\%$  sand, add "with sand" to group name.

<sup>G</sup> If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

<sup>H</sup> If fines are organic, add "with organic fines" to group name.

<sup>I</sup> If soil contains  $\geq 15\%$  gravel, add "with gravel" to group name.

<sup>J</sup> If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

<sup>K</sup> If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

<sup>L</sup> If soil contains  $\geq 30\%$  plus No. 200 predominantly sand, add "sandy" to group name.

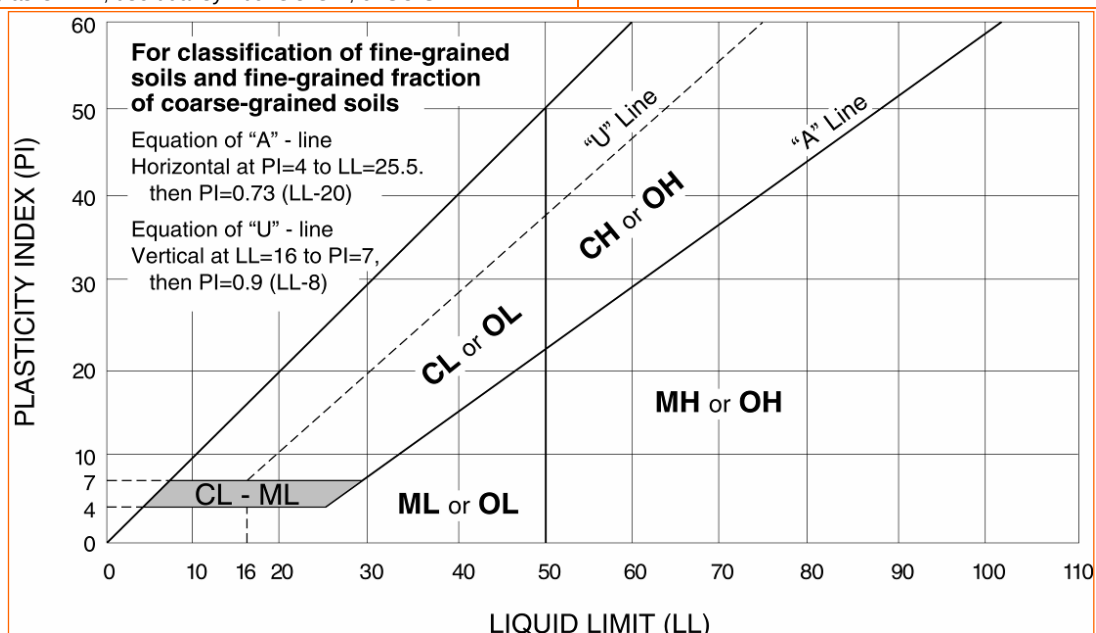
<sup>M</sup> If soil contains  $\geq 30\%$  plus No. 200, predominantly gravel, add "gravelly" to group name.

<sup>N</sup> PI  $\geq 4$  and plots on or above "A" line.

<sup>O</sup> PI < 4 or plots below "A" line.

<sup>P</sup> PI plots on or above "A" line.

<sup>Q</sup> PI plots below "A" line.



| WEATHERING                  |                                                                                                                                                                                                          |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Term                        | Description                                                                                                                                                                                              |
| <b>Unweathered</b>          | No visible sign of rock material weathering, perhaps slight discoloration on major discontinuity surfaces.                                                                                               |
| <b>Slightly weathered</b>   | Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than in its fresh condition. |
| <b>Moderately weathered</b> | Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestones.                                 |
| <b>Highly weathered</b>     | More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones.                              |
| <b>Completely weathered</b> | All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.                                                                                       |
| <b>Residual soil</b>        | All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.                    |

| STRENGTH OR HARDNESS    |                                                                                                                         |                                          |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Description             | Field Identification                                                                                                    | Uniaxial Compressive Strength, psi (MPa) |
| <b>Extremely weak</b>   | Indented by thumbnail                                                                                                   | 40-150 (0.3-1)                           |
| <b>Very weak</b>        | Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife                              | 150-700 (1-5)                            |
| <b>Weak rock</b>        | Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer | 700-4,000 (5-30)                         |
| <b>Medium strong</b>    | Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer   | 4,000-7,000 (30-50)                      |
| <b>Strong rock</b>      | Specimen requires more than one blow of geological hammer to fracture it                                                | 7,000-15,000 (50-100)                    |
| <b>Very strong</b>      | Specimen requires many blows of geological hammer to fracture it                                                        | 15,000-36,000 (100-250)                  |
| <b>Extremely strong</b> | Specimen can only be chipped with geological hammer                                                                     | >36,000 (>250)                           |

| DISCONTINUITY DESCRIPTION                          |                                |                                                    |                               |
|----------------------------------------------------|--------------------------------|----------------------------------------------------|-------------------------------|
| Fracture Spacing (Joints, Faults, Other Fractures) |                                | Bedding Spacing (May Include Foliation or Banding) |                               |
| Description                                        | Spacing                        | Description                                        | Spacing                       |
| <b>Extremely close</b>                             | < ¾ in (<19 mm)                | <b>Laminated</b>                                   | < ½ in (<12 mm)               |
| <b>Very close</b>                                  | ¾ in – 2-1/2 in (19 - 60 mm)   | <b>Very thin</b>                                   | ½ in – 2 in (12 – 50 mm)      |
| <b>Close</b>                                       | 2-1/2 in – 8 in (60 – 200 mm)  | <b>Thin</b>                                        | 2 in – 1 ft. (50 – 300 mm)    |
| <b>Moderate</b>                                    | 8 in – 2 ft. (200 – 600 mm)    | <b>Medium</b>                                      | 1 ft. – 3 ft. (300 – 900 mm)  |
| <b>Wide</b>                                        | 2 ft. – 6 ft. (600 mm – 2.0 m) | <b>Thick</b>                                       | 3 ft. – 10 ft. (900 mm – 3 m) |
| <b>Very Wide</b>                                   | 6 ft. – 20 ft. (2.0 – 6 m)     | <b>Massive</b>                                     | > 10 ft. (3 m)                |

Discontinuity Orientation (Angle): Measure the angle of discontinuity relative to a plane perpendicular to the longitudinal axis of the core. (For most cases, the core axis is vertical; therefore, the plane perpendicular to the core axis is horizontal.) For example, a horizontal bedding plane would have a 0-degree angle.

| ROCK QUALITY DESIGNATION (RQD) <sup>1</sup> |               |
|---------------------------------------------|---------------|
| Description                                 | RQD Value (%) |
| <b>Very Poor</b>                            | 0 - 25        |
| <b>Poor</b>                                 | 25 – 50       |
| <b>Fair</b>                                 | 50 – 75       |
| <b>Good</b>                                 | 75 – 90       |
| <b>Excellent</b>                            | 90 - 100      |

1. The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.

Reference: U.S. Department of Transportation, Federal Highway Administration, Publication No FHWA-NHI-10-034, December 2009  
Technical Manual for Design and Construction of Road Tunnels – Civil Elements

**WEATHERING**

|                   |                                                                                                                                                                                                                                                            |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fresh             | Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline.                                                                                                                                                  |
| Very slight       | Rock generally fresh, joints stained, some joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline.                                                                                                |
| Slight            | Rock generally fresh, joints stained, and discoloration extends into rock up to 1 in. Joints may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored. Crystalline rocks ring under hammer.                          |
| Moderate          | Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some show clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock. |
| Moderately severe | All rock except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick.                                        |
| Severe            | All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left.                            |
| Very severe       | All rock except quartz discolored or stained. Rock "fabric" discernible, but mass effectively reduced to "soil" with only fragments of strong rock remaining.                                                                                              |
| Complete          | Rock reduced to "soil". Rock "fabric" no discernible or discernible only in small, scattered locations. Quartz may be present as dikes or stringers.                                                                                                       |

**HARDNESS (for engineering description of rock – not to be confused with Moh's scale for minerals)**

|                 |                                                                                                                                                                                                              |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Very hard       | Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of geologist's pick.                                                                                    |
| Hard            | Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.                                                                                              |
| Moderately hard | Can be scratched with knife or pick. Gouges or grooves to ¼ in. deep can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.                          |
| Medium          | Can be grooved or gouged 1/16 in. deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1-in. maximum size by hard blows of the point of a geologist's pick.         |
| Soft            | Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure. |
| Very soft       | Can be carved with knife. Can be excavated readily with point of pick. Pieces 1-in. or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.                         |

**Joint, Bedding, and Foliation Spacing in Rock <sup>1</sup>**

| Spacing          | Joints           | Bedding/Foliation |
|------------------|------------------|-------------------|
| Less than 2 in.  | Very close       | Very thin         |
| 2 in. – 1 ft.    | Close            | Thin              |
| 1 ft. – 3 ft.    | Moderately close | Medium            |
| 3 ft. – 10 ft.   | Wide             | Thick             |
| More than 10 ft. | Very wide        | Very thick        |

1. Spacing refers to the distance normal to the planes, of the described feature, which are parallel to each other or nearly so.

**Rock Quality Designator (RQD) <sup>1</sup>**

| RQD, as a percentage | Diagnostic description |
|----------------------|------------------------|
| Exceeding 90         | Excellent              |
| 90 – 75              | Good                   |
| 75 – 50              | Fair                   |
| 50 – 25              | Poor                   |
| Less than 25         | Very poor              |

1. RQD (given as a percentage) = length of core in pieces 4 inches and longer / length of run

**Joint Openness Descriptors**

| Openness              | Descriptor      |
|-----------------------|-----------------|
| No Visible Separation | Tight           |
| Less than 1/32 in.    | Slightly Open   |
| 1/32 to 1/8 in.       | Moderately Open |
| 1/8 to 3/8 in.        | Open            |
| 3/8 in. to 0.1 ft.    | Moderately Wide |
| Greater than 0.1 ft.  | Wide            |

References: American Society of Civil Engineers. Manuals and Reports on Engineering Practice - No. 56. Subsurface Investigation for Design and Construction of Foundations of Buildings. New York: American Society of Civil Engineers, 1976. U.S. Department of the Interior, Bureau of Reclamation, Engineering Geology Field Manual.

## **DOCUMENT 006000 - FORMS**

### **1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS**

- A. The following form of Owner/Contractor General Conditions shall be used for Project:
  - 1. AIA Document A201, "General Conditions of the Contract for Construction."

### **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; <http://www.aia.org/contractdocs/purchase/index.htm>; [docspurchases@aia.org](mailto:docspurchases@aia.org); (800) 942-7732.
- C. Information and Modification Forms:
  - 1. Form for Requests for Information (RFIs): AIA Document G716, "Request for Information (RFI)."
  - 2. Form of Request for Proposal: AIA Document G709, "Work Changes Proposal Request."
  - 3. Change Order Form: AIA Document G701, "Change Order."
  - 4. Form of Architect's Memorandum for Minor Changes in the Work: AIA Document G707, "Architect's Supplemental Instructions."
  - 5. Form of Change Directive: AIA Document G714, "Construction Change Directive."
- D. Payment Forms:
  - 1. Schedule of Values Form: AIA Document G703, "Continuation Sheet."
  - 2. Payment Application: AIA Document G702/703, "Application and Certificate for Payment and Continuation Sheet."

**END OF DOCUMENT 006000**



## DOCUMENT 007300 - SUPPLEMENTARY CONDITIONS – AIA

### 1.1 SUMMARY

#### A. Document Includes:

1. Supplementary Conditions.

#### B. Related Documents:

1. Document 006000 - General Conditions – AIA-201-2007.

### 1.2 SUPPLEMENTARY CONDITIONS

- A. These Supplementary Conditions modify the General Conditions of the Contract for Construction, AIA Document A201-2007, and other provisions of the Contract Documents as indicated below. All provisions that are not so modified remain in full force and effect.
- B. The terms used in these Supplementary Conditions which are defined in the General Conditions of the Contract for Construction, AIA Document A201-2007, have the meanings assigned to them in the General Conditions.
- C. The following items are supplements that modify, change, delete from or add to the “General Conditions of the Contract for Construction”, AIA Document A201, 2007 Edition. Where any article of the general conditions is modified or any paragraph, subparagraph or clause thereof is modified or deleted by these supplementary conditions, the unaltered provisions of that article, paragraph, subparagraph or clause shall remain in effect.

## ARTICLE 1.1 - BASIC DEFINITIONS

Add the following subparagraphs:

- 1.1.8 Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does 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.
- 1.1.9 Furnish: To supply and deliver, unload, inspect for damage.
- 1.1.10 Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, and make ready for use.
- 1.1.11 Provide: To furnish and install.

## ARTICLE 3 CONTRACTOR

### 3.5 WARRANTY

The Contractor is to submit to the Owner a Maintenance Bond as shown on the following pages at the end of this section and is hereby made a part of this specification and is hereto attached. The completed Maintenance Bond is to be submitted with the final payment request.

### 3.6 TAXES

Sales Taxes: The Contractor shall pay Sales Tax.

3.6.2 Unemployment Compensation Taxes: All taxes under this heading shall be paid by the Contractor.

3.6.3 Social Security Taxes: All taxes under this heading shall be paid by the Contractor.

### 3.7 PERMITS, FEES AND NOTICES

Permits and Ordinances: Permits and ordinances shall be complied with and paid by the Contractor.

Add the following subparagraph:

- 3.7.5 Building permits, testing costs and other fees: The Contractor shall be responsible for paying for all testing, building permits, utility tap fees and street use permits involved with the construction of this project.

**Note: State Statute Title 74 – Sec. 324.11 requires the State Fire Marshal’s office to issue a Building Permit in areas of the state where no permit is issued by a local authority. Accordingly, when no local authority is present, the successful bidder shall be required to submit a permit application and secure a permit from the office of the State Fire Marshal prior to start of construction.**

### 3.10 CONTRACTOR’S CONSTRUCTION SCHEDULES

- 3.10.4** Cooperation Between Contractors & Coordination of Work: All Contractors shall be responsible to fit and coordinate their work with other trades so that all work may proceed with minimum delays and so that good fit and appearance is achieved. Contractor shall establish and hold periodic jobsite meetings with Subcontractors and Owner as required to insure a smooth and orderly communication procedure between all parties involved in construction. The Contractor is required to take notes at periodic jobsite meetings and distribute copies to Owner and other parties involved (see section Page 01310-1). All questions, directions, etc. required by the Owner shall be directed to the Contractor and not to individual Subcontractors. **No extras will be allowed for changes or additions to the work as directed by the Owner without a written change order signed by Owner and the Architect as provided within these Specifications.**

### 3.11 DOCUMENTS AND SAMPLES AT THE SITE

- 3.11.1 Add the following sentence: The Contractor shall tape, with clear tape, to the drawings and project manual all addenda, change orders, proposal requests, Architect’s supplemental instructions, construction change directives and other modifications.

### 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- 3.12.12 Shop drawings and samples shall be dated and marked to show the names of the project, architect, contractor, originating subcontractor, manufacturer of supplier, and separate detailer if pertinent. Shop drawings shall completely identify specification section and locations at which materials or equipment are to be installed. Reproductions of contract drawings as shop drawings only when specifically authorized in writing by the Architect.
- 3.12.13 After Contractor’s review of the shop drawing to see that the shop drawing conform to the contract documents, submission of shop drawings and samples shall be accompanied by 2 copies of a transmittal letter containing project name, contractor’s name, number of drawings and number of samples, titles and other pertinent data.
- 3.12.14.1 Submit 1 prints of each shop drawing, including fabrication, erection, layout and setting drawings and such other drawings as required under various sections of these specifications, until final approval is obtained. Submit 1 copies of manufacturer’s descriptive data including catalog sheets for materials, equipment and fixtures, showing dimensions, performance characteristics and capacities, wiring diagrams and controls, schedules, and other pertinent information as required. Where printed materials describe more than one project or model, clearly identify which is to be furnished.
- 3.12.14.2 Contractor is responsible for obtaining and distributing required prints of shop drawings to his subcontractors and material suppliers after, as well as before, final approval. Prints of

reviewed shop drawings shall be made from transparencies that carry the Architect's appropriate stamp.

## ARTICLE 7 CHANGES IN THE WORK

### 7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.3.3 Add the following sentence: Cost shall be limited to the following: cost of materials (including sales tax if applicable) and cost of delivery; cost of supervision, labor (including social security, old age and unemployment insurance and fringe benefits under collective bargaining agreements); hand tools; workmen's compensation insurance; bond premiums; and rental value of power tools and equipment. Overhead shall include the following: superintendence; wages of time keepers; watchmen and clerks; incidentals; general office expense; and all other expenses not included in "cost".

1. Compute requests for changes, be they additions or deductions as follows:
  - a. For work performed by the Contractor:

|                                      |             |
|--------------------------------------|-------------|
| Net cost of material                 | a           |
| State sales tax                      | b           |
| Net placing cost                     | c           |
| W.C. insurance premium and FICA tax  | d           |
|                                      | a+b+c+d     |
| Overhead and profit, 10% x (a+b+c+d) | e           |
| Allowable bond premium               | f           |
| Total Cost                           | a+b+c+d+e+f |
  - b. Credit for work omitted shall be computed as outlined in a, except the Contractor's share of overhead and profit percentage is 0%.
  - c. For work performed by Subcontractors, compute as outlined above, plus the Construction Manager shall add an overhead and profit of 4.00% to the Subcontractor's cost plus the allowable bond premium.

## ARTICLE 8 TIME

### 8.2 PROGRESS AND COMPLETION

8.2.2.1 The Contractor shall execute the Agreement with the Owner when the Owner issues a written "Notice of Award". The Contractor shall execute the construction of the project when the Owner issues a written "Notice to Proceed". The "Notice of Award" and the "Notice to Proceed" are shown on the following pages at the end of this section and is hereby made a part of this specification and is hereto attached.

## ARTICLE 9 PAYMENTS AND COMPLETION

### 9.2 SCHEDULES OF VALUES

9.2.1 Add the following sentence: The schedule of values shall be prepared in such a manner that each item of work and each subcontracted item of work is shown as a single line item.

### 9.4 CERTIFICATES FOR PAYMENT

9.4.3 Payments to the Contractor shall be made as follows: Partial payment will be made as the work progresses on not later than the thirtieth (30th) day of each calendar month for work done during the preceding calendar month on estimates certified by the Architect. In preparing estimates, the material delivered on the site and preparatory work may be taken into consideration. The Architect may, if he so desires, arrive at the method of payment by means of considering the amount of work yet to be completed and the value thereof, plus the retained percentage. Estimates for monthly payments must be submitted at least

- fifteen (15) days in advance of the date set for payment.
- 9.4.4 In making such partial payments for the work, there shall be retained ten percent (10%) of the estimated amount until fifty (50) percent completion and acceptance of all work covered by the contract. A reduction in retainage to five percent (5%) may be authorized by the Owner if project is in conformance with construction schedule. The Final Payment, with retainage, shall be made after Final Written Approval from Owner.
- 9.4.5 All material and work covered by the partial payments shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work, or as a waiver of the right of the Owner to require the fulfillment of all terms of the contract.
- 9.4.6.1 The Owner/Architect may, before making any payment, require the Contractor to furnish releases, receipts, or waiver of liens from all persons performing work and supplying material to the Contractor, if the Owner/Architect deems the same necessary in order to protect his client's interest. The Owner/Architect, however, may make payment in part or in full to the Contractor without requiring the furnishing of such releases, receipts, or waiver of liens. Any payment so made shall in no way impair the obligations of any sureties on any bond or bonds furnished under the contract.
- 9.4.7 Upon completion and acceptance of all work required hereunder, the amount due the Contractor under this contract shall be paid upon certification by the Architect and approval of the Owner. The Owner may, before making final payment, occupy the building. Final approval of the building & site by the Owner could take 30 days after final acceptance is given by the Architect.
- 9.4.8 The Owner may withhold from any payment otherwise due to the Contractor as much as may be necessary to protect the Owner against any claims that may be urged against the Owner, and if he so elects, may also withhold any amounts due from the Contractor to any sub-contractor or materialmen for labor or material furnished by them. The foregoing provisions shall be construed solely for the benefit of the Owner and shall not require the Owner to determine or adjust any claims or disputes between the Contractor or his sub-contractors or materialmen, or to withhold any monies for their protection unless the Owner elects to do so. The failure or refusal of the Owner to withhold any monies from the Contractor shall in no way impair the obligations of any surety or sureties under any bond or bonds furnished under this contract.

## ARTICLE 11 INSURANCE AND BONDS

### 11.1 CONTRACTOR'S LIABILITY INSURANCE

- 11.1.1 In the first line following the word "maintain", insert the words "in a company or companies licensed to do business in the state in which the project is located".

### 11.2 OWNER'S LIABILITY INSURANCE

- 11.2.1 Delete this paragraph and add the following: The contractor shall purchase and maintain "Owner's Protective Liability" including architect as an additional insured, insurance to protect the Owner against claims which may arise from operations under the contract with limits equal to those specified in article C, 11.1.2.1 above. A copy of this policy shall be forwarded to the Architect Prior to beginning any portion of the Work.
- 11.2.1.1 If this insurance is written with stipulated amounts deductible under the terms of the policy, the contractor shall pay the difference attributable to deductions in any payments made by the insurance carrier paid by this insurance.

### 11.3 PROPERTY INSURANCE

- 11.3.1 Add the following sentence: The contractor shall purchase and maintain property insurance upon the entire work, at the site to the full insurable value thereof. Such insurance shall be in a company against which the Owner has no reasonable objection. A copy of this policy must be forwarded to the Architect Prior to beginning any portion of the Work.
- 11.3.1.1 If this insurance is written with stipulated amounts deductible under the terms of the policy, the contractor shall pay the difference attributable to deduction in any payments made by the insurance carrier on claims paid by this insurance.
- 11.3.6 Delete this paragraph and add the following: The contractor shall file the original and two certified copies of all policies with the Owner and architect before exposure to loss may occur. If the Owner is damaged by the failure of the contractor to maintain such insurance and to so notify the Owner, then the contractor shall bear all reasonable costs properly attributed thereto.
- 11.3.7 Add the following sentences:  
In waiving rights of recovery under terms of this subparagraph, the term "Owner" shall be deemed to include his employees, and the architect and his employees as the Owner's representative, as provided in the contract documents.  
Subrogation: This insurance shall not be invalidated should the named insured waive, in writing prior to a loss, any right of recovery against any party for loss occurring to the property described.

#### 11.4 PERFORMANCE BOND AND PAYMENT BOND

Add the following subparagraph:

- 11.4.3 The bond value requirements are as follows:
1. Provide a 100 percent Performance Bond and Payment Bond on AIA A312 as shown on the following pages and is hereby made a part of this specification and is hereto attached.
  2. Deliver bonds within 10 days after Notice of Award to the successful bidder. The Bond shall be executed by a bonding company authorized to do business in the State of Arkansas.
  3. Bond must comply with all aspects of Arkansas Act No. 351, as enacted by the 1953 General Assembly.
  4. Terms Not Defined In AIA Documents
    - a) Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does 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.
    - b) Furnish or Supply: To supply and deliver, unload, inspect for damage.
    - c) Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, and ready for use.
    - d) Provide to furnish or supply, plus install.
  5. An original and four copies of these bonds shall be submitted and shall have issuing agents Power of Attorney attached to each.
  6. The Owner shall not make any payments until the Contractor furnishes the Owner the receipt from the County Clerk that Bonds have been filed.

#### 11.5 INSURANCE REQUIREMENTS

1. The Contractor shall furnish the insurance required herein at his own expense and shall file with the Owner the policies or certificates as required, concurrent with the signing of the contract.
2. All insurance policies and certificates shall be submitted with the original and three (3)

copies.

3. All policies delivered to the Owner shall be returned to the Contractor upon termination of the work for cancellation and refund of premium, if any.

4. The Contractor shall furnish a Certificate of Insurance addressed to the Owner and showing that he carries the following insurance:

A. Workmen's Compensation:

State: Statutory Amount

Employer's Liability: \$100,000.00

B. Comprehensive General Liability: (Including Premises-Operations; Independent Contractors' Protective; Products and Completed Operations; Broad Form Property Damage):

Bodily Injury: \$1,000,000.00 Each Occurrence  
\$2,000,000.00 Aggregate,  
Products and Completed  
Operations

Property Damage: \$1,000,000.00 Each Occurrence

Property Damage Liability for explosion and collapse.

Contractual Liability (Hold Harmless Coverage):

Bodily Injury: \$1,000,000.00 Each Occurrence

Property Damage: \$1,000,000.00 Each Occurrence

\$2,000,000.00 Aggregate

C. Comprehensive Automobile Liability (owned, non-owned, hired):

Bodily Injury: \$1,000,000.00 Each Person

\$1,000,000.00 Each Accident

Property Damage: \$1,000,000.00 Each Occurrence

D. Aircraft Liability:

Limits proposed by Contractor for Owner's approval.

Insurance in those amounts shall be maintained throughout the life of the contract.

The certificate shall state that coverage afforded by the policies shall not be cancelled without fifteen (15) days notice (written) to the Owner.

E. Builder Risk Insurance: The Contractor shall purchase in the names of the Contractor and the Owner a completed value form builder's risk insurance policy with fire and extended coverage in the amount of the contract price and shall contain a vandalism and malicious mischief endorsement and be subject to the approval of the Owner as to form and substance and shall provide for Owner's Protective Liability Policy in the amount of \$1,000,000.00 for each occurrence and aggregate for bodily injury, property damage and personal injury.

The policy shall provide that any loss is to be adjusted with and paid to the Owner as trustee for all funds. Any adjustment made in good faith by the Owner shall be binding upon the Contractor.

The Owner shall have the right to have said policy issued with a mortgage clause in favor of any mortgagee holding a mortgage on the premises where the insured improvements are to be constructed. The original of the policy shall be delivered to the Owner. A blanket form builder's risk policy covering this and other projects of the Contractor will not be acceptable. In the event of partial or full occupancy by the Owner prior to substantial completion of the building, the Contractor shall notify the insurance carrier and obtain a "Use and Occupancy Waiver" to prevent invalidation for

such insurance by occupancy. Contractor shall deliver the waiver promptly to Owner.

#### ARTICLE 13 MISCELLANEOUS PROVISION

##### 13.5 TESTING - Not Used.

#### ARTICLES 15 - 34 MISCELLANEOUS SUPPLEMENTARY CONDITIONS

##### 15.1 UNIT PRICES FOR ROCK EXCAVATION

15.1.1 The Contractor, in arriving at his bid, shall assume that it will be possible to accomplish all excavation without the use of air hammers or blasting for removal. In the event that rock is encountered in the footing excavation, the Contractor shall be allowed extra compensation in the form of a unit price for a yard of rock excavated.

##### 16.1 SUBSTITUTION OF MATERIALS OR EQUIPMENT

16.1.1 Throughout the specifications, definite materials are specified. It is the intention of the Architect to set and maintain a definite standard and not to discriminate against another manufactured product. Should the Contractor desire to make a substitution, he shall submit to the Architect a written request 10 days prior to the awarding of the contract. No approvals for substitutions shall be made unless authorized in writing by the Architect.

##### 16.2 COOPERATION WITH BUILDING OFFICIALS

16.2.1 Cooperate with applicable city or other governmental officials and inspectors at all times. If such officials or inspectors deem special inspection necessary, provide assistance and facilities that will expedite his inspection.

##### 17.1 SUPERINTENDENT

17.1.1 The Contractor shall keep on his work throughout its progress, a competent superintendent and any necessary assistants. All directions given to the Superintendent shall be binding as if given to the Contractor in his absence. Important directions shall be so confirmed on written request in each case.

##### 17.2 MEASUREMENTS

17.2.1 Before doing any work or ordering any materials, the contractor shall verify all measurements of existing and new work, and shall be responsible for their correctness. Any differences that may be found shall be submitted to the architect for consideration before proceeding with the work. No extra compensation will be allowed because of difference between actual dimensions and measurements indicated on the working drawings.

##### 18.1 SHOP DRAWINGS

18.1.1 The Contractor shall submit to the Architect for approval within sixty (60) days after the awarding of the contract, shop drawings and/or brochures which shall include all essential information relating to the materials or specialty specified. Shop drawings and all submittals shall conform to format indicated in Section 013300 - "Submittals". Shop drawings shall be submitted on all items where required by the technical sections of the specification.

## 18.2 MANUFACTURER'S SPECIFICATIONS AND INSTRUCTIONS

- 18.2.1.1 Install all manufactured items of material or equipment in strict accordance with the manufacturer's recommended specifications, except that the specifications herein, where more stringent, shall be complied with.
- 18.2.1.2 At the completion of the project and prior to final acceptance by the Owner, provide the Owner with three complete sets of operating and maintenance instructions, and demonstrate to him the procedures for proper operation and maintenance of all equipment

## 19.1 SECTION HEADINGS

- 19.1.1 The specifications following are outlined under the MasterSpec format in order to make explanation clearer, also for the purpose of segregating the various trades. Mention of "work not included" in the various sections refers only to the sections, and such reference shall not act to exclude any part of the work from the Contract or finished buildings.

## 19.2 JOB MAINTENANCE

- 19.2.1 During the course of their work, all crafts and trades shall protect all work that preceded theirs from damage, and they shall make repairs or replacements to any damage caused either directly or indirectly by them.
- 19.2.2 Site housekeeping and final cleaning shall be done in accordance with Article 14 of the General Conditions.

## 20.1 BRACING

- 20.1.1 The Contractor shall properly brace, temporarily or permanently, any or all parts of the work as necessary or directed during construction of these buildings.

## 20.2 LEGAL JURISDICTION

- 20.2.1 If litigation is initiated by any party to tide contract agreement and a legal petition is filed against the Owner, it shall be understood by virtue of the signed contract agreement that said petition shall be filed in the Owner's jurisdiction.

## 21.1 TEMPORARY ENCLOSURES

- 21.1.1 When necessary for the protection of any of the materials or work, or employees, to erect covered enclosures, walls, fences, etc., or temporarily enclose the openings of the building, or to insure protected and lighted egress from the facility, then this shall be done by the Contractor to the satisfaction of the Architect. See related paragraphs in this section of the specifications.

## 21.2 USE AND OCCUPANCY PRIOR TO ACCEPTANCE BY OWNER

- 21.2.1 The contractor agrees to the use and occupancy of a portion or unit of the project before formal acceptance by the Owner, provided the Owner:
  - 1. Secures written consent of the contractor except in the event, in tide opinion of the architect, the contractor is chargeable with unwarranted delay in final clean-up of



- punch list items or other contract requirements.
2. Secures endorsement from the insurance-carrier and consent of the surety permitting occupancy of the building or use of the project during the remaining period of construction, or,
  3. when the project consists of more than one building and one of the buildings is occupied, secures permanent fire and extended coverage insurance, including a permit to complete construction. Consent of the surety must also be obtained.
  4. Except with respect to subparagraph "3", use and occupancy prior to formal acceptance does not relieve the contractor of his responsibility to maintain builder's risk, fire and extended coverage insurance on a 100% basis for the benefit of the Owner, the prime contractor and all subcontractors until the project is completed and accepted by the Owner.

## 22.1 PROTECTION FROM WEATHER

- 22.1.1 The Contractor shall protect all incomplete walls with suitable coverings during low temperatures, rain or snow. He shall make temporary provisions to take the water away from building before leaders are erected and shall in every way protect the building and contents from damage or unnecessary wettings.

## 22.2 LOCAL LABOR

- 22.2.1 The contractor is encouraged to use local labor, but not at the expense of poor workmanship and higher cost; however, all things being equal, local workmen shall be given preference.

## 23.1 SURPLUS MATERIALS

- 23.1.1 All materials delivered on the premises to form a part of the work described in the specifications shall be considered the property of the Owner and shall not be removed prior to final acceptance of the contract work, the Contractor shall then remove all surplus materials (not designated for attic stock) from the premises.

## 23.2 COMPLIANCE WITH STATE AND FEDERAL LAWS

- 23.2.1 Contractor assumes full responsibility for the payment of all contributions and payroll taxes (State and Federal) as to all subcontractors and employees engaged in the performance of work pursuant hereto and further agrees to check and meet all requirements that might be specified under regulations of the administrative officials or board charged with the enforcement of any State or Federal act. Contractor agrees to furnish Owner, upon request, a certificate or other evidence of compliance therewith.

## 24.1 CLEANLINESS OF PREMISES DURING CONSTRUCTION

- 24.1.1 During construction, the Contractor and each sub-contractor shall keep all materials in an orderly manner and shall remove all scraps, debris, cans, etc., from the job site on a daily basis. All debris shall be contained in wire containers or dumpsters prior to removal. Any debris dropped off-site or which blows off-site is the responsibility of the Contractor to clean up.

## 24.2 RECORD DRAWINGS

- 24.2.1 Provide and maintain in proper order and in good, clean condition in the field office at the project site, one complete set of blue line prints of all working drawings. Neatly and accurately inscribe in red pencil any and all changes in the location and type of partitions, walls, electrical and mechanical services and equipment. This set of prints shall be presented to the Owner at the time of final acceptance of the building by the Owner.

## 25.1 WORKMANSHIP

- 25.1.1 Work classified within the skilled trades shall be performed by men who possess the skill, talent, and experience with which to produce a finished job of the best workmanship as compared with grades of good, better and best. Workmanship shall be considered of prime importance in all parts of the work.
- 25.1.2 Corrective measures for defective workmanship are limited and very often do not completely correct the defect. Thus, it shall be the duty of Contractor to order the discharge of any person whose skill and ability are not of the best, or whose employment, in the opinion of the Architect, is not for the best interest of the work.

## 25.2 OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (OSHA)

- 25.2.1 The contractor shall comply with the latest edition and revision of the Federal Occupational Safety and Health Act of 1970, for construction.

## 26.1 BUILDING GUARANTEE

- 26.1.1.1 The construction under this contract, including all materials and equipment shall be guaranteed for a period of one year from the date of substantial completion against all defects in material or workmanship. The guarantee shall be in accordance with the Article 12.2.2 of the General Conditions (AIA Document A-201). Any costs for work or materials required during this period due to failure of original material or workmanship shall be borne by the Contractor.
- 26.1.1.2 All Contractors/Subcontractors will, at no cost to the Owner, maintain and promptly repair or replace any defects due to inferior or faulty workmanship or materials for a period of one (1) year following substantial completion, (some longer guarantee periods are set forth in the sections for certain items of work). All Contractors/Subcontractors shall advise their suppliers, materialmen, etc. of this guarantee requirement for their work and materials.

## 27.1 TEMPORARY FACILITIES

- 27.1.1 During the duration of the construction, the Contractor shall furnish temporary facilities as indicated in Section 015000 – Temporary Facilities.

## 27.2 GUARANTY BONDS

- 27.2.1 The contractor does hereby warrant and/or guarantee against defects in all workmanship and materials performed or furnished by him directly or by his subcontractors for a period of one (1) year from the date of completion, as evidenced by the date of the final certificate or final acceptance of the project. Said warranty and/or guarantee shall be in the form of a good and sufficient bond in a sum equal to one-hundred percent (100%) of the value of item submitted.
- 27.2.2 Bonds shall be signed by an official of the bonding company and shall be accompanied by the bonding agent's written power-of-attorney in order that one copy may be attached to each copy of the contract agreement.

## 28.1 PROJECT COORDINATION

- 28.1.1.1 Project coordination shall be performed in accordance with Section 013100 – Project Management and Coordination: Coordination and Meetings.

## 29.1 RECORD DRAWINGS

- 29.1.1 Contractor and all trade-contractors shall keep accurate records of any deviations, modifications, field changes, etc. done in the field during construction and shall prepare and submit one (1) set of marked-up (red lined) working drawings, drawings and specifications, catalogue cuts, etc. to the Architect upon completion of project. Record drawings are a condition of project completion, and must be submitted prior to release of final retention.

## 30.1 CONTRACT CLOSEOUT

- 30.1.1.1 Contract Closeout shall be performed in accordance with SECTION 017700.

## 31.1 PROJECT JOB SIGN

- 31.1.1.1 Design to be furnished by Architect.

## 33.1 TIME EXTENSION

- 33.1.1.1 The Contractor shall record all weather delays to be submitted each month with Pay Request.

## 34.1 PRE-CONSTRUCTION CONFERENCE

- 34.1.1 The successful contractor, his superintendent, and a representative from his mechanical and electrical subcontractors will be required to attend a pre-construction conference at a place to be designated. The time and date of conference is to be coordinated with the Architect.

## END OF SECTION 007300

## SECTION 011000 - SUMMARY

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work by Owner.
4. Access to site.
5. Coordination with occupants.
6. Work restrictions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

#### 1.2 PROJECT INFORMATION

A. Project Identification: Phillips Park North Restroom Pavilion.

1. Project Location: Bentonville, AR.

B. Owner: Bentonville Parks and Recreation Department.

C. Architect: Crafton Tull.

#### 1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Masonry, steel, and wood deck Restroom Building.

B. Type of Contract.

1. Project will be constructed under a single prime contract.

#### 1.4 WORK BY OWNER

A. Items noted NIC (Not in Contract): Some equipment will be furnished and installed by Contractor; beginning before the project is completed. See Plans.

B. Contractor's Responsibilities:

1. Review Owner-reviewed Shop Drawings, Product Data, and Samples.

2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
3. Handle, store, install and finish products
4. Repair or replace items damaged after receipt.

#### 1.5 ACCESS TO SITE

- A. General: 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.
- B. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- C. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

#### 1.6 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
  1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
  2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

#### 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. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
  1. Notify Owner not less than two days in advance of proposed utility interruptions.
  2. Obtain Owner's permission before proceeding with utility interruptions.
- C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
  1. Notify Owner not less than two days in advance of proposed disruptive operations.
  2. Obtain Owner's permission before proceeding with disruptive operations.

- D. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

## SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

#### 1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

#### 1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: 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. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    - e. Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail." Or forms acceptable to Architect.
- B. Contractor -Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim 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. Work Change Proposal Request Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail." or form acceptable to Architect.

#### 1.4 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

#### 1.5 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 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
  - 1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

#### 1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor 's construction schedule.
  - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. Items required to be indicated as separate activities in Contractor 's construction schedule.
  - 2. Submit the schedule of values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values.
  - 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. Arrange schedule of values consistent with format of AIA Document G703.
  - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents.
  - 4. 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.
  - 5. 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.

6. 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.
7. 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.

### 1.3 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.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 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 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.
  2. Electronic submittals in pdf form are preferred.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
  1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit conditional final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

4. Waiver Forms: Submit executed waivers of lien on forms 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 (preliminary if not final).
  4. Submittal schedule (preliminary if not final).
  5. List of Contractor's staff assignments.
  6. List of Contractor's principal consultants.
  7. Copies of building permits.
  8. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  9. Initial progress report.
  10. Report of preconstruction conference.
  11. Certificates of insurance and insurance policies.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract 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: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. 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 G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
  5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
  6. AIA Document G707-1994, "Consent of Surety to Final Payment."
  7. Evidence that claims have been settled.
  8. 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.
  9. 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 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. Coordination drawings.
  - 2. Requests for Information (RFIs).
  - 3. Project meetings.
- B. Related Requirements:
  - 1. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

#### 1.2 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A. Include the following information in tabular form:
  - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.

#### 1.4 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.

- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor 's construction schedule.
  - 2. Preparation of the schedule of values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Preinstallation conferences.
  - 7. Project closeout activities.
  - 8. Startup and adjustment of systems.

## 1.5 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
  - 1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - b. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
  - 1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid.
  - 2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings.
  - 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
  - 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
  - 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles,

door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.

6. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor 's responsibility.

## 1.6 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor 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 information or interpretation and the following:
  1. Project name.
  2. Project number.
  3. Date.
  4. Name of Contractor.
  5. Name of Architect.
  6. RFI number, numbered sequentially.
  7. RFI subject.
  8. Specification Section number and title and related paragraphs, as appropriate.
  9. Drawing number and detail references, as appropriate.
  10. Field dimensions and conditions, as appropriate.
  11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor 's signature.
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. RFI Forms: AIA Document G716 or Software-generated form with substantially the same content as indicated above, acceptable to Architect.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect 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 inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
  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 Section 012600 "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 10 five working days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly. Software log with not less than the following:
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.
- 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 five working days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
  2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

## 1.7 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: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.

- b. Phasing.
  - c. Critical work sequencing and long-lead items.
  - d. Designation of key personnel and their duties.
  - e. Procedures for processing field decisions and Change Orders.
  - f. Procedures for RFIs.
  - g. Procedures for testing and inspecting.
  - h. Procedures for processing Applications for Payment.
  - i. Distribution of the Contract Documents.
  - j. Submittal procedures.
  - k. Preparation of record documents.
  - l. Use of the premises.
  - m. Work restrictions.
  - n. Working hours.
  - o. Owner's occupancy requirements.
  - p. Responsibility for temporary facilities and controls.
  - q. Procedures for moisture and mold control.
  - r. Procedures for disruptions and shutdowns.
  - s. Construction waste management and recycling.
  - t. Parking availability.
  - u. Office, work, and storage areas.
  - v. Equipment deliveries and priorities.
  - w. First aid.
  - x. Security.
  - y. Progress cleaning.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
  - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility problems.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written instructions.
    - n. Warranty requirements.
    - o. Compatibility of materials.
    - p. Acceptability of substrates.
    - q. Temporary facilities and controls.



- r. Space and access limitations.
  - s. Regulations of authorities having jurisdiction.
  - t. Testing and inspecting requirements.
  - u. Installation procedures.
  - v. Coordination with other work.
  - w. Required performance results.
  - x. Protection of adjacent work.
  - y. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at biweekly intervals.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  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. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor 's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Progress cleaning.
      - 10) Quality and work standards.
      - 11) Status of correction of deficient items.
      - 12) Field observations.
      - 13) Status of RFIs.
      - 14) Status of proposal requests.
      - 15) Pending changes.
      - 16) Status of Change Orders.

- 17) Pending claims and disputes.
  - 18) Documentation of information for payment requests.
3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor 's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

**END OF SECTION 013100**

## SECTION 013300 - SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

#### 1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

#### 1.3 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

#### 1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - 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 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 15 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 15 days for review of each resubmittal.
- C. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  2. Name file with submittal number or other unique identifier, including revision identifier.
    - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., BTV-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., BTV-061000.01.A).
  3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
  4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
    - a. Project name.
    - b. Date.
    - c. Name and address of Architect.
    - d. Name of Contractor.
    - e. Name of firm or entity that prepared submittal.
    - f. Names of subcontractor, manufacturer, and supplier.
    - g. Category and type of submittal.
    - h. Submittal purpose and description.
    - i. Specification Section number and title.
    - j. Specification paragraph number or drawing designation and generic name for each of multiple items.
    - k. Drawing number and detail references, as appropriate.
    - l. Location(s) where product is to be installed, as appropriate.
    - m. Related physical samples submitted directly.
    - n. Indication of full or partial submittal.
    - o. Transmittal number.
    - p. Submittal and transmittal distribution record.
    - q. Other necessary identification.
    - r. Remarks.
- D. Options: Identify options requiring selection by Architect.
- E. Deviations: Identify deviations from the Contract Documents on submittals.
- F. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
  2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

- G. 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.
- H. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

## PART 2 - PRODUCTS

### 2.1 SUBMITTAL PROCEDURES

#### A. General Submittal Procedure Requirements:

1. Submit electronic submittals via email as PDF electronic files.
  - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
2. Action Submittals: Submit one electronic copy of each submittal unless otherwise indicated. Architect will return copy once review is complete.
3. Informational Submittals: Submit one electronic copy of each submittal unless otherwise indicated. Architect will not return copies.
4. Certificates and Certifications Submittals: Provide a 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.
  - a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.

#### B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
  - a. Manufacturer's catalog cuts.
  - b. Manufacturer's product specifications.
  - c. Standard color charts.
  - d. Statement of compliance with specified referenced standards.
  - e. Testing by recognized testing agency.
  - f. Application of testing agency labels and seals.
  - g. Notation of coordination requirements.
  - h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
  - a. Wiring diagrams showing factory-installed wiring.
  - b. Printed performance curves.
  - c. Operational range diagrams.

- d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  - 5. Submit Product Data before or concurrent with Samples.
  - 6. Submit Product Data in the following format:
    - a. PDF electronic file.
- 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, unless submittal based on Architect's digital data drawing files is otherwise permitted.
- 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
  - 2. Submit Shop Drawings in the following format:
    - a. PDF electronic file.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of applicable Specification Section.
  - 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
  - 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  - 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

- a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
- 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.
    - 1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
  - 1. Submit product schedule in the following format:
    - a. PDF electronic file.
- F. Coordination Drawings Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."
- G. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."
- H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."
- I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."
- J. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- K. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- L. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

- M. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- N. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- O. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- P. Material Test Reports: Submit 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.
- Q. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- R. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- S. Schedule of Tests and Inspections: Comply with requirements specified in Section 014000 "Quality Requirements."
- T. Preconstruction Test Reports: Submit 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.
- U. Compatibility Test Reports: Submit 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.
- V. Field Test Reports: Submit written reports 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.
- W. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.



- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor 's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

### 3.2 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 each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

### END OF SECTION 013300

## SECTION 014000 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specified tests, inspections, and related actions do not limit Contractor 's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
  - 3. Specific test and inspection requirements are not specified in this Section.

#### 1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
  - 1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. 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. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

### 1.3 CONFLICTING REQUIREMENTS

- A. Referenced Standards: 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 conflicting 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.

### 1.4 INFORMATIONAL SUBMITTALS

- A. Contractor 's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
  - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
  - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

## 1.5 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
  2. Project title and number.
  3. Name, address, and telephone number of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  5. Other required items indicated in individual Specification Sections.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

## 1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - d. When testing is complete, remove test specimens, assemblies, and mockups, and laboratory mockups; do not reuse products on Project.
  - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
  - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
  - 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
    - a. Allow seven days for initial review and each re-review of each mockup.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  6. Demolish and remove mockups when directed unless otherwise indicated.
- K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections.

## 1.7 QUALITY CONTROL

- A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
  2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  6. Do not perform any duties of Contractor.
- E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

## 1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
- B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
  2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
  4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  6. Retesting and reinspecting corrected work.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.

- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

### 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

**END OF SECTION 014000**



## 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 to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- 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.

#### 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.

## 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.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

### 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".

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
  - 1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

- 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.

### 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing 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. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- 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. 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.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- 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. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access project electronic documents and maintain electronic communications.

### 3.3 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 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 within construction limits 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: Architect will provide design for the project sign prior to start of construction.
  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 touchup signs so they are legible at all times.
- G. 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."
- H. 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.
- I. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- J. 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.

### 3.4 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.
- 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: 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.
- D. 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.
- E. 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.
- F. 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 environmentally safe materials.
- G. 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 work day.
- H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- I. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- J. 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 not complete, insulate temporary enclosures.

### 3.5 MOISTURE AND MOLD CONTROL

- A. Contractor 's Moisture Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.

- C. Partially Enclosed Construction Phase: 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. Discard or replace water-damaged and wet material.
  - 4. Discard, replace, or clean stored or installed material that begins to grow mold.
  - 5. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: 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. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

### 3.6 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

## SECTION 016000 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

#### 1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

#### 1.3 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. 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 seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "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, select product 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 and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine 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. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  - 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  - 6. 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: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.



- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  - 3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Owner reserves the right to limit selection to products with warranties 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 manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor 's convenience will not be considered.
  - 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor 's convenience will not be considered.
  - 3. Products:
    - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor 's convenience will be considered unless otherwise indicated.
    - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
  - 4. Manufacturers:

- a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor 's convenience will be considered unless otherwise indicated.
  - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
- 5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor 's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
  - 1. Evidence that the proposed product does not require 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**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of Owner's portion of the Work.
  - 6. Coordination of Owner-installed products.
  - 7. Progress cleaning.
  - 8. Starting and adjusting.
  - 9. Protection of installed construction.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for coordination of, and limits on use of Project site.
  - 2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

#### **1.2 DEFINITIONS**

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Certified Surveys: Submit two copies signed by land surveyor.
- B. Certificates: Submit certificate signed by land surveyor, certifying that location and elevation of improvements comply with requirements.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

## 1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
  - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
  - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
  - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.
- C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
  2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
  2. List of detrimental conditions, including substrates.
  3. List of unacceptable installation tolerances.
  4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to

other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 013100 "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly.
- B. Engage a land surveyor experienced in laying out the Work, using the following accepted surveying practices:
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish limits on use of Project site.
  - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 4. Inform installers of lines and levels to which they must comply.
  - 5. Check the location, level and plumb, of every major element as the Work progresses.
  - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
  - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

### 3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
  2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

### 3.5 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb, and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.

- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
  - 1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

### 3.6 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of Work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.



- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.7 COORDINATION OF OWNER'S PORTION OF THE WORK

- A. Site Access: Provide access to Project site for Owner's construction personnel and Owner's separate contractors.
1. Provide temporary facilities required for Owner-furnished, Contractor-installed products.
  2. Refer to Section 011000 "Summary" for other requirements for Owner-furnished, Contractor-installed products
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel and Owner's separate contractors.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

### 3.8 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

### 3.10 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

- C. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- D. Comply with manufacturer's written instructions for temperature and relative humidity.

**END OF SECTION 017300**

## **SECTION 017700 - CLOSEOUT PROCEDURES**

### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  - 5. Repair of the Work.

### **1.2 ACTION SUBMITTALS**

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.

### **1.3 CLOSEOUT SUBMITTALS**

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

### **1.4 MAINTENANCE MATERIAL SUBMITTALS**

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

### **1.5 SUBSTANTIAL COMPLETION PROCEDURES**

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor 's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction

- photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
  5. Submit test/adjust/balance records.
  6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
  6. Advise Owner of changeover in heat and other utilities.
  7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Complete final cleaning requirements, including touchup painting.
  10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for final completion.

## 1.6 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. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report and warranty.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Submit list of incomplete items in the following format:
    - a. PDF electronic file. Architect will return annotated copy.

#### 1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## PART 3 - EXECUTION

### 3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials.



- Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
  - k. Remove labels that are not permanent.
  - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
  - p. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

**END OF SECTION 017700**

## SECTION 017900 - DEMONSTRATION AND TRAINING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. 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.
  - 3. Demonstration and training video recordings.

#### 1.2 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and 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. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
  - 1. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on compact disc.

#### 1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training.

## 1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. 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 for equipment not part of a system, as required by individual Specification Sections.
- 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 as applicable to the system, equipment, or component:
  - 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 training manual organized in coordination with requirements in Division 01.

### 3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner through Contractor.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

### 3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
  - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video Recording Format: Provide high-quality color video recordings with menu navigation in format acceptable to Architect.
- C. Narration: Describe scenes on video recording by audio narration by microphone while or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.
- D. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

**END OF SECTION 017900**

## 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 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Footings.
  - 2. Foundation walls.
  - 3. Slabs-on-grade.

#### 1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Samples: For waterstops and vapor retarder.
- E. Qualification Data: For installer, manufacturer and testing agency.
- F. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
  - 1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- G. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.

2. Admixtures.
  3. Form materials and form-release agents.
  4. Steel reinforcement and accessories.
  5. Fiber reinforcement.
  6. Waterstops.
  7. Curing compounds.
  8. Floor and slab treatments.
  9. Bonding agents.
  10. Adhesives.
  11. Vapor retarders.
  12. Semi-rigid joint filler.
  13. Joint-filler strips.
  14. Repair materials.
- H. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.
- I. Field quality-control test and inspection reports.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
  2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
  2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.



## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Products: Subject to compliance with requirements, provide one of the products specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  - 1. Plywood, metal, or other approved panel materials.
  - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
    - a. High-density overlay, Class 1 or better.
    - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
    - c. Structural 1, B-B or better; mill oiled and edge sealed.
    - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- E. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- F. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- G. Form-Release Agent: Commercially formulated form-release agent containing VOC's less than 250 grams per liter that will not bond with stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

- H. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## 2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

## 2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.
- B. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.
- C. Bar Supports: Use only concrete bricks as supports under rebars (regular rebar chairs not permitted)

## 2.5 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - 1. Portland Cement: ASTM C 150, Type I/II gray. Supplement with the following:
    - a. Fly Ash: ASTM C 618, Class C or F.
    - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
  - 1. Maximum Coarse-Aggregate Size: 1-1/2 inch nominal for foundations, stem walls and slabs on grade; 1 inch nominal for elevated slabs.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Lightweight Aggregate: ASTM C 330, 3/4-inch nominal maximum aggregate size.
- D. Water: ASTM C 94/C 94M and potable.

## 2.6 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

## 2.7 WATERSTOPS

- A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
  - 1. Available Products:
    - a. Colloid Environmental Technologies Company; Volclay Waterstop-RX.
    - b. Concrete Sealants Inc.; Conseal CS-231.
    - c. Greenstreak; Swellstop.
    - d. Henry Company, Sealants Division; Hydro-Flex.
    - e. JP Specialties, Inc.; Earthshield Type 20.
    - f. Progress Unlimited, Inc.; Superstop.
    - g. TCMiraDRI; Mirastop.

## 2.8 VAPOR BARRIERS

- A. Plastic Vapor Retarder: ASTM E 1745, Class A vapor retarder with minimum WVTR of 0.008 as tested by ASTM E96 and permeance as tested after mandatory conditioning (ASTM E 154 sections 8,11,12,13) less than 0.01 Perms. Include manufacturer's recommended adhesive or pressure-sensitive tape (minimum width of tape shall be 4 inches). Construct pipe boots from vapor retarder material and pressure sensitive tape per manufacturer's recommendations.
  - 1. Available Products:
    - a. Stego Wrap (15 mil) Vapor Barrier by Stego Industries
    - b. Ecoshield-E (15 mil) Epro
    - c. Iron Barr (15 mil) Flatiron Films
- B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

## 2.9 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.

## 2.10 FLOOR AND SLAB TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces. Apply only to areas scheduled for 'sealed concrete' floor finish. Refer to drawings for location. Protect slab from discoloration prior to applying floor treatment. Clean slab as recommended by floor treatment manufacturer if necessary prior to floor treatment application.
  - 1. Products:
    - a. ChemMasters; Chemsil Plus.
    - b. ChemTec International; ChemTec One.
    - c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Intraseal.
    - d. Curecrete Distribution Inc.; Ashford Formula.
    - e. Dayton Superior Corporation; Day-Chem Sure Hard.
    - f. Euclid Chemical Company (The); Euco Diamond Hard.
    - g. Kaufman Products, Inc.; SureHard.
    - h. L&M Construction Chemicals, Inc.; Seal Hard.
    - i. SpecChem; SpecHard.

## 2.11 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
  - 1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- D. Reglets: Fabricate reglets of not less than 0.0217-inch- thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- E. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

## 2.12 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.

4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
  4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

## 2.13 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 20 percent.
  2. Combined Fly Ash and Pozzolan: 25 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

## 2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Proportion normal-weight concrete mixture for Footings and Piers as follows:
1. Minimum Compressive Strength: 3000 psi at 28 days or as shown on drawings.
  2. Maximum Water-Cementitious Materials Ratio: 0.57.
  3. Minimum Cementitious Materials Content: 470 lb/cu. yd.
  4. Slump Limit: 6 inches, plus or minus 1 inch.
  5. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
- B. Proportion normal-weight concrete mixture for Slabs-on-Grade as follows:
1. Minimum Compressive Strength: 3500 psi at 28 days or as shown on drawings.
  2. Maximum Water-Cementitious Materials Ratio: 0.49.

3. Minimum Cementitious Materials Content: 470 lb/cu. yd.
  4. Slump Limit: 4 inches, plus or minus 1 inch.
  5. Air Content: Do not allow air content of troweled finished slabs to exceed 3 percent.
- C. Proportion normal-weight concrete mixture for elevated slabs on metal decking as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
  2. Maximum Water-Cementitious Materials Ratio: 0.49.
  3. Minimum Cementitious Materials Content: 564 lb/cu. yd.
  4. Slump Limit: 5 inches, plus or minus 1 inch.
  5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
- D. Slabs on Composite Steel Floor Deck: Proportion structural lightweight concrete mixture as follows:
1. Minimum Compressive Strength: 3000 psi at 28 days.
  2. Maximum Water-Cementitious Material Ratio: 0.49.
  3. Calculated Equilibrium Unit Weight: 115 lb/cu. ft. plus or minus 3 lb/cu. ft. as determined by ASTM C 567.
  4. Slump Limit: 4 inches plus or minus 1 inch.
  5. Air Content: Do not allow air content of troweled finished slabs to exceed 3 percent.
  6. Lightweight Concrete Mix Design: If lightweight concrete is to be pumped, make the following changes from the submitted design.
    - a. Presoak or presaturate the lightweight aggregate.
    - b. Maintain a 564 lbs. per cubic yard minimum cement content.
    - c. Use any admixtures that will aid in pumping:
      - 1) Air entrainment sufficient for 5 to 8 percent air.
      - 2) Water reducers.
      - 3) Fly ash or natural pozzolan.
      - 4) Pumping aid.
    - d. Reduce volume of coarse aggregate and increase volume of fine aggregate.
    - e. Increase maximum slump to at least 6 inches using water reducing admixtures.
    - f. Use a natural sand that is well graded with the fineness modules preferably between 2.2 and 2.7.
    - g. Use a properly combined coarse and fine aggregate gradation by volume that will prevent the paste from being squeezed through the voids between aggregate particles
- E. Proportion normal-weight concrete mixture for walls as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
  2. Maximum Water-Cementitious Materials Ratio: 0.49
  3. Minimum Cementitious Materials Content: 564 lb/cu. yd.
  4. Slump Limit: 4 inches, plus or minus 1 inch.
  5. Air Content: Do not allow air content of walls to exceed 3 percent.

## 2.15 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.16 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
  1. Class A, 1/8 inch for smooth-formed finished surfaces.
  2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  1. Install keyways, reglets, recesses, and the like, for easy removal.
  2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
  - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
  - 3. Install dovetail anchor slots in concrete structures as indicated.

### 3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
  - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
  - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset



laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### 3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
  - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  - 5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: See drawings for locations. Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
  - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
  - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
  - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

### 3.6 WATERSTOPS

- A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

### 3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301 and as follows:
  1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
- H. After a rain event, the contractor must delay concrete placement for slabs on grade until the subgrade is dry. The contractor may use commercial air blowers to remove accumulated water.

### 3.8 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
  1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
  2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

### 3.9 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in 1 direction.
  - 1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings or to receive mortar setting beds for ceramic or quarry tile, Portland cement terrazzo, and other bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
  - 1. Apply float finish to surfaces indicated, to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Apply a trowel finish to surfaces indicated and to floor and slab surfaces to be exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
  - 2. Finish surfaces to the following tolerances, according to ASTM E 1155 for a randomly trafficked floor surface:
    - a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
    - b. Specified overall values of flatness, F(F) 45; and of levelness, F(L) 35; with minimum local values of flatness, F(F) 31; and of levelness, F(L) 24; for slab-on-grade in atrium lobby.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated or where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
  - 1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

### 3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

### 3.11 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

### 3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  - 1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### 3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 1. Repair finished surfaces containing defects. Surface defects include spalls, pop-outs, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 2. After concrete has cured at least 14 days, correct high areas by grinding.
  - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  - 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.14 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections, sample materials and prepare test reports.
- B. Inspections:
1. Steel reinforcement placement.
  2. Steel reinforcement welding.
  3. Headed bolts and studs, hooked anchor bolts and other embedded steel anchors
  4. Monitor addition of water to concrete at job site and length of time concrete is allowed to remain in truck during pour.
  5. Certify each delivery ticket indicating class of concrete delivered (or poured), amount of water added and time at which cement and aggregate were discharged into truck, and time at which concrete was discharged from truck.
  6. Verification of use of required design mixture.
  7. Concrete placement, including conveying and depositing.
  8. Curing procedures and maintenance of curing temperature.
  9. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Contractors Responsibilities:
1. Furnish necessary labor to assist testing agency in obtaining and handling samples at job-site.
  2. Advise testing agency in advance of operations to allow for assignment of testing personnel and testing.
  3. Provide and maintain for use of testing agency adequate facilities for proper curing of concrete test specimens on project site in accordance with ASTM C31
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. but less than 25 cu. yd. plus one set for each additional 75 cu. yd. or fraction thereof.

- a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Test to be taken from sample at point of discharge from hose. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete: one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.
  - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
  - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
  - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
  - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
11. Concrete for which strength tests do not meet criteria for acceptance shall be considered inadequate until proven otherwise.
12. Completed concrete work will be accepted when the requirements of ACI 301, Chapter 18 have been complied with.
13. In any case, where strength tests of concrete fail to meet criteria specified herein, Architect shall be sole judge of structural adequacy of concrete. In such case, burden of proof of structural adequacy shall be responsibility of Contractor. Strength evaluation shall conform to requirements of ACI 318. If strength evaluation testing indicates, in opinion of Architect, that structure is of inadequate strength; portions of structure in question shall be repaired or removed and replaced as directed by Architect at no additional expense to Owner. If strength tests fall below specified strength, but not so low as to cause concern for structural adequacy, Architect may request improved conditions of curing or modification of design mixes to improve strength.



14. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
  15. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
  16. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
  17. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.
- E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

**END OF SECTION 033000**

## SECTION 042000 - BRICK VENEER

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Clay face brick.

B. Products Installed but Not Furnished under This Section:

1. Steel lintels in masonry veneer.
2. Steel shelf angles for supporting masonry veneer.

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For each type and color of brick and colored mortar.

#### 1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of product.

#### 1.4 QUALITY ASSURANCE

A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.

1. Build sample panels for typical exterior wall in sizes approximately 48 inches long by 48 inches high by full thickness.

#### 1.5 FIELD 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. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

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.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## PART 2 - PRODUCTS

### 2.1 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects will be exposed in the completed Work.

### 2.2 BRICK

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
  - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
  - 2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Clay Face Brick: Facing brick complying with ASTM C 216 or hollow brick complying with ASTM C 652, Class H40V (void areas between 25 and 40 percent of gross cross-sectional area).
  - 1. Modular brick, color to match adjacent Concession Building. Provide samples for Architect's review and approval.
  - 2. Grade SW.
  - 3. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C 67.
  - 4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
  - 5. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing according to ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet or shall have a history of successful use in Project's area.

### 2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91/C 91M.

- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in masonry mortar.
  - 1. Provide color samples for Architect's review and approval
- F. Colored Cement Products: Packaged blend made from Portland cement and hydrated lime, masonry cement or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
- G. Aggregate for Mortar: ASTM C 144.
  - 1. White-Mortar Aggregates: Natural white sand or crushed white stone.
  - 2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- I. Water: Potable.

## 2.4 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.
- B. 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.
- C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized-steel wire.
  - 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized-steel wire.
- D. Adjustable Masonry-Veneer Anchors:
  - 1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
  - 2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch-thick steel sheet, galvanized after fabrication.
  - 3. Fabricate wire ties from 0.187-inch- diameter, hot-dip galvanized-steel wire unless otherwise indicated.

4. Fabricate wire connector sections from 0.187-inch- diameter, hot-dip galvanized, carbon-steel wire.
5. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.
6. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with a projecting vertical tab having a slotted hole for inserting wire tie.
7. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having holes for inserting vertical legs of wire tie formed to fit anchor section.
8. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a sheet metal anchor section, 1-1/4 inches wide by 9 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 5-1/2 inches long, stamped into center to provide a slot between strap and base for inserting wire tie.
9. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 3-5/8 inches long, stamped into center to provide a slot between strap and base for inserting wire tie.
10. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a gasketed sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and base for inserting wire tie.
11. Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter and with coating with salt-spray resistance to red rust of more than 800 hours according to ASTM B 117.

## 2.5 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with Section 076200 "Sheet Metal Flashing and Trim" and as follows:
  1. Fabricate metal drip edges 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.
  2. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
- B. Flexible Flashing: Use **[ one of ]** the following unless otherwise indicated:
  1. Copper-Laminated Flashing: 5-oz./sq. ft. or 7-oz./sq. ft. copper sheet bonded between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
  2. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
  3. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.040 inch.
  4. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy.

- 5. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D 4637/D 4637M, 0.040 inch thick.
- C. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

## 2.6 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.
- B. Weep/Vent Products: Use one of the following unless otherwise indicated:
  - 1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
  - 2. Aluminum Weep Hole/Vent: Units made from sheet aluminum, designed to fit into a head joint and consisting of a vertical channel, with louvers stamped in web and with a top flap to keep mortar out of the head joint; factory primed and painted before installation to comply with Section 099113 "Exterior Painting" in color selected by Architect.
  - 3. Vinyl Weep Hole/Vent: Units made from flexible PVC, designed to fit into a head joint and consisting of a louvered vertical leg, flexible wings to seal against ends of masonry units, and a top flap to keep mortar out of the head joint; in color selected by Architect.
- C. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
  - 1. Configuration: Provide one of the following:
    - a. Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent clogging with mortar droppings.
    - b. Strips, not less than 1-1/2 inches thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.
    - c. Sheets or strips, full depth of cavity and installed to full height of cavity.

## 2.7 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.

## 2.8 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. Use portland cement-lime or masonry 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. Use Type N unless another type is indicated.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
  - 1. Pigments shall not exceed 10 percent of portland cement by weight.
  - 2. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
  - 3. Application: Use pigmented mortar for exposed mortar joints.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
  - 1. Mix to match Architect's sample.
  - 2. Application: Use colored aggregate mortar for exposed mortar joints.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. 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.
- B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

### 3.2 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.

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 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.

### 3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

### 3.4 MORTAR BEDDING AND JOINTING

- A. Lay 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.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.



### 3.5 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and masonry backup with masonry-veneer anchors to comply with the following requirements:
1. Fasten screw-attached anchors through sheathing to wall framing and to masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
  2. Embed tie sections connector sections and continuous wire in masonry joints.
  3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  4. Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than one anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.
  5. Space anchors as indicated, but not more than 16 inches o.c. vertically and 25 inches o.c. horizontally, with not less than one 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.
  6. Space anchors as indicated, but not more than 18 inches o.c. vertically and horizontally. Install additional anchors within 12 inches of openings and at intervals, not exceeding 24 inches, around perimeter.

### 3.6 FLASHING, WEEP HOLES, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  2. At 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.
  3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
  4. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
- C. Install weep holes in veneers in head joints of first course of masonry immediately above embedded flashing.
1. Use specified weep/vent products to form weep holes.
  2. Space weep holes 24 inches o.c. unless otherwise indicated.
- D. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

- E. 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.

### 3.7 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
  - 2. Protect adjacent non-masonry surfaces from contact with cleaner.
  - 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  - 4. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
  - 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

**END OF SECTION 042000**

## SECTION 042200 - CONCRETE UNIT MASONRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Concrete masonry units.
  - 2. Decorative concrete masonry units.

#### 1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
- C. Samples: For each type and color of the following:
  - 1. Exposed Decorative CMUs.
  - 2. Pigmented and colored-aggregate mortar.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of product. For masonry units, include data on material properties and material test reports substantiating compliance with requirements.
- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
  - 1. Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
  - 2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.

#### 1.5 FIELD 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. Remove and replace unit masonry damaged by frost

or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## PART 2 - PRODUCTS

### 2.1 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

### 2.2 CONCRETE MASONRY UNITS

- A. 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.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
- C. CMUs: ASTM C90.
  - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
  - 2. Density Classification: Normal weight unless otherwise indicated.
- D. Decorative CMUs: ASTM C90.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Nettleton Burnished Block, color to match adjacent Concession Building.
  - 2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
  - 3. Density Classification: Normal weight.
  - 4. Pattern and Texture:
    - a. Match adjacent Concession Building.

## 2.3 CONCRETE LINTELS

- A. Concrete Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs.

## 2.4 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C91/C91M.
- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.
- F. Colored Cement Products: Packaged blend made from **[portland cement and hydrated lime]** **[or]** **[masonry cement]** and mortar pigments, all complying with specified requirements, and containing no other ingredients.
- G. Aggregate for Mortar: ASTM C144.
  - 1. White-Mortar Aggregates: Natural white sand or crushed white stone.
  - 2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- H. Aggregate for Grout: ASTM C404.
- I. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- J. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
- K. Water: Potable.

## 2.5 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
- C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.

1. Interior Walls: Hot-dip galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Spacing of Cross Rods: Not more than 16 inches o.c.
4. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

## 2.6 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

## 2.7 MASONRY-CELL FILL

- A. Loose-Fill Insulation: Perlite complying with ASTM C549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).
- B. Lightweight-Aggregate Fill: ASTM C331/C331M.

## 2.8 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  1. Do not use calcium chloride in mortar or grout.
  2. Use portland cement-lime or masonry 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 C270 Specification. Provide the following types of mortar for applications stated unless another type is indicated.
  1. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
- D. Grout for Unit Masonry: Comply with ASTM C476.
  1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.

2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
3. Provide grout with a slump of 8 to 11 inches as measured in accordance with ASTM C143/C143M.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. 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.

### 3.2 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.

#### 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 head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

### 3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- E. 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.
- F. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

### 3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
  - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
  - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
  - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs 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.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

### 3.5 MASONRY-CELL FILL

- A. Pour Foamed-In-Place insulation into cavities to fill void spaces. Insulation shall be installed per Section 072119.

### 3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
  - 1. Space reinforcement not more than 16 inches o.c.



2. 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.

### 3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
  2. Anchor masonry 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.

### 3.8 REINFORCED UNIT MASONRY

- 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 that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- 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 TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  2. Limit height of vertical grout pours to not more than 60 inches.

### 3.9 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Construction Manager 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 is done at Contractor's expense.
- B. Inspections: Special inspections in accordance with Level B in TMS 402/ACI 530/ASCE 5.
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 Prior to Construction: One set of tests.
  - D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
  - E. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140 for compressive strength.
  - F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.
  - G. Mortar Test (Property Specification): For each mix provided, in accordance with ASTM C780. Test mortar for **[mortar air content] [and] [compressive strength]**.
  - H. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.
  - I. Prism Test: For each type of construction provided, in accordance with ASTM C1314 at seven days and at 28 days.
- 3.10 REPAIRING, POINTING, AND CLEANING
- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
  - B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
    - 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
    - 2. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
- 3.11 MASONRY WASTE DISPOSAL
- A. 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. Do not dispose of masonry waste as fill within 18 inches of finished grade.
  - B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
  - C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

**END OF SECTION 042200**

## SECTION 042300 - GLASS UNIT MASONRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Glass block set in mortar.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: Glass-block units and joint materials involving color selection.

### PART 2 - PRODUCTS

#### 2.1 GLASS BLOCK

- A. Hollow Glass Block: Hollow units made from transparent glass, with manufacturer's standard edge coating.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Seves.
  - 2. Pattern 1: 4" Premiere Series – Clarity 8x8x4 & 4x8x4.
  - 3. Pattern 2: 4" Premiere Series – Clarity Sharpe Corner 90°.
  - 4. Edge-Coating Color: As indicated by manufacturer's designations.
  - 5. Finish: Fine sand blasted finish applied by Distributor to the interior face of all units.

#### 2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or Type II. Provide natural color or white cement as required to produce mortar color indicated.
  - 1. Where joints are indicated to be raked out and pointed, gray cement may be used for setting mortar.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Aggregate: ASTM C144, with 100 percent passing No. 8 sieve.
  - 1. For pointing mortar and joints narrower than 1/4 inch, use aggregate graded with 100 percent passing No. 16 sieve.
  - 2. White Aggregates: Natural white sand or crushed white stone.

- 3. Colored Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- E. Dry Water-Repellent Admixture: Dry mixture of stearates, water-reducing agents, and fine aggregates intended to reduce capillarity in mortar.
- F. Water: Potable.

## 2.3 GLASS UNIT MASONRY ACCESSORIES

- A. Panel Reinforcement: Ladder-type units, butt welded, not lapped and welded; complying with ASTM A951/A951M in straight lengths of not less than 10 feet, and as follows:
  - 1. Exterior Walls: Hot-dip galvanized, carbon-steel wire.
  - 2. Wire Size: W1.7 or 0.148-inch diameter.
  - 3. Width: 1-5/8 inches.
  - 4. Spacing of Cross Rods: Not more than 16 inches apart.
- B. Panel Anchors: Glass-block manufacturer's standard perforated steel strips, 0.0359 inch by 1-3/4 inches wide by 24 inches long, hot-dip galvanized after fabrication to comply with ASTM A153/A153M.
- C. Fasteners, General: Unless otherwise indicated, provide Type 304 or Type 316 stainless steel fasteners at exterior walls and zinc-plated fasteners with coating complying with ASTM B633, Class Fe/Zn 5, at interior walls. Select fasteners for type, grade, and class required.
- D. Asphalt Emulsion: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M or ASTM D1227.
- E. Sealants: Manufacturer's standard elastomeric sealants of base polymer and characteristics indicated below that comply with applicable requirements in Section 079200 "Joint Sealants."
  - 1. Silicone: Nonstaining, S, NS, 50, NT.
  - 2. Urethane: S, NS, 25, NT.
- F. Sealant Accessories: Provide sealant accessories, including primers, bond-breaker tape, and cylindrical sealant backing, that comply with applicable requirements in Section 079200 "Joint Sealants."

## 2.4 MORTAR MIXES

- A. General: Do not use admixtures unless otherwise indicated.
  - 1. For mortar in exterior panels, use water-repellent admixture according to admixture manufacturer's written instructions.
- B. Mortar for Glass Unit Masonry Assemblies: Comply with ASTM C270, Proportion Specification for Type S mortar.
- C. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
- D. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

## PART 3 - EXECUTION

### 3.1 INSTALLING GLASS BLOCK WITH MORTAR

- A. Apply a heavy coat of asphalt emulsion to sill and adhere expansion strips to jambs and heads with asphalt emulsion. Allow asphalt emulsion to dry before placing mortar. Trim expansion strips to width required to fit glass block and to full lengths of heads and jambs.
- B. Set glass block with completely filled bed and head joints, with no furrowing, accurately spaced and coordinated with other construction. Maintain 3/8 to 1/2-inch exposed joint widths unless otherwise indicated.
- C. Install panel reinforcement in horizontal joints at spacing indicated and continuously from end to end of panels; comply with the following requirements:
  - 1. Vertical Spacing of Panel Reinforcement for Exterior Panels: Every other course but not more than 16 inches o.c., starting with first course above sill.
  - 2. Do not bridge expansion joints with panel reinforcement.
  - 3. Place panel reinforcement in joints immediately above and below all openings within glass unit masonry assemblies.
  - 4. Lap panel reinforcement not less than 6 inches if more than one length is necessary.
- D. Install panel anchors at locations indicated and in same horizontal joints where panel reinforcement occurs. Extend panel anchors at least 12 inches into joints, and bend within expansion joints at edges of panels and across the head. Attach panel anchors as follows:
- E. Use plastic spacers or temporary wedges in mortar joints to produce uniform joint widths and to prevent mortar from being squeezed out of joints.
- F. Keep expansion joints free of mortar.
- G. Install sealant at jambs, heads, mullions, and other locations indicated. Prepare joints, including installation of primer and bond-breaker tape or cylindrical sealant backing, and apply elastomeric sealants to comply with requirements in Section 079200 "Joint Sealants."

### 3.2 SCHEDULE

- A. Install Thickset 90 block generally in locations below 8'-0" A.F.F See Drawings for pattern.
- B. Install regular Clarity block generally in locations above 8'-0" A.F.F. See Drawings for pattern.
- C. Install corner units at wall corners as shown in the Drawings.

### 3.3 CLEANING

- A. Perform final cleaning of glass unit masonry assemblies when surface is not exposed to direct sunlight. Start at top of panel using generous amounts of clean water. Remove water with clean, dry, soft cloths; change cloths frequently to eliminate dried mortar particles and aggregate.

**END OF SECTION 042300**

## **SECTION 051200 - STRUCTURAL STEEL FRAMING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Structural steel.
  - 2. Grout.
- B. Related Sections include the following:
  - 1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
  - 2. Division 05 Section "Steel Decking" for field installation of shear connectors.
  - 3. Division 05 Section "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame, miscellaneous steel fabrications and other metal items not defined as structural steel.
  - 4. Division 09 painting Sections for surface preparation and priming requirements.
  - 5. Division 5 Section "Steel Joist Framing" for K-series and Long-span steel joists.

#### **1.3 DEFINITIONS**

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. Connections: Provide details of connections required by the Contract Documents to be completed by structural-steel fabricator to withstand ASD loads indicated and comply with other information and restrictions indicated.
  - 1. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections indicated.
- B. Construction: Type 2, simple framing.

#### **1.5 SUBMITTALS**

- A. Shop Drawings: Show fabrication of structural-steel components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.

2. Include embedment drawings.
  3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
  4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
  5. For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed and prepared by the qualified professional engineer, registered in the state of Arkansas, responsible for their preparation.
- B. Welding certificates.
- C. Qualification Data: For Installer fabricator and testing agency.
- D. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
1. Structural steel including chemical and physical properties.
  2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
  3. Direct-tension indicators.
  4. Tension-control, high-strength bolt-nut-washer assemblies.
  5. Shear stud connectors.
  6. Shop primers.
  7. Nonshrink grout.
- E. Source quality-control test reports.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who can furnish references and evidence of satisfactory experience with similar size projects over a three-year period.
- B. Fabricator Qualifications: A qualified fabricator who can furnish references and evidence of satisfactory experience with similar size projects over a three-year period.
- C. Shop-Painting Applicators: Qualified according to SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators", or approved equal.
- D. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code-Steel."
- E. Comply with applicable provisions of the following specifications and documents:
1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
  2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
  3. AISC's Load and Resistance Factor Design Specification for Structural Steel Buildings."
  4. AISC's "Specification for the Design of Steel Hollow Structural Sections."
  5. AISC's "Specification for Load and Resistance Factor Design of Single-Angle Members."
  6. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Administrative Requirements."

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
  - 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
  - 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

## 1.8 COORDINATION

- A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

## PART 2 - PRODUCTS

### 2.1 STRUCTURAL-STEEL MATERIALS AND ACCESSORIES

- A. W-Shapes: ASTM A 992/A 992M, Grade 50.
- B. Channels, Angles, M, S-Shapes: ASTM A 36/A 36M Grade 36.
- C. Plate and Bar: ASTM A 36/A 36M, Grade 36.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
  - 1. Weight Class: As indicated.
  - 2. Finish: Galvanized.
- F. Medium-Strength Steel Castings: ASTM A 27/A 27M, Grade 65-35, carbon steel.
- G. High-Strength Steel Castings: ASTM A 148/A 148M, Grade 80-50, carbon or alloy steel.
- H. Welding Electrodes: Comply with AWS requirements.

### 2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
  - 1. Finish: Plain.
  - 2. Direct-Tension Indicators: ASTM F 959, Type 325 compressible-washer type.
    - a. Finish: Plain.



- B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.
- C. Headed Anchor Rods: ASTM F 1554, Grade 36; ASTM A 307, Grade A, straight.
  - 1. Nuts: ASTM A 563 heavy hex carbon steel.
  - 2. Plate Washers: ASTM A 36/A 36M carbon steel.
  - 3. Washers: ASTM F 436 hardened carbon steel.
  - 4. Finish: Plain.
- D. Threaded Rods: ASTM A 36/A 36M.
  - 1. Nuts: ASTM A 563 heavy hex carbon steel.
  - 2. Washers: ASTM A 36/A 36M carbon steel.
  - 3. Finish: Plain.
- E. Clevises and Turnbuckles: ASTM A 108, Grade 1035, cold-finished carbon steel.
- F. Eye Bolts and Nuts: ASTM A 108, Grade 1030, cold-finished carbon steel.
- G. Sleeve Nuts: ASTM A 108, Grade 1018, cold-finished carbon steel.
- H. Deformed Bar Anchors (DBA): Material shall be low carbon steel conforming to ASTM A496. The minimum ultimate tensile strength shall be 80,000 psi. The minimum yield strength shall be 70,000 psi. The anchors shall be welded to the base steel using ferrules sized so as to attach the anchor to the base steel with an ultimate tensile and shear strength greater than or equal to the ultimate strength of the anchor. Anchors shall be D2L deformed wire anchors by Nelson Division of TRW, or equal.

## 2.3 PRIMER

- A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
- B. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20, ASTM A 780.

## 2.4 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

## 2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings."
  - 1. Camber structural-steel members where indicated.
  - 2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
  - 3. Mark and match-mark materials for field assembly.

4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
  1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning."
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.
- G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.
- H. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10 inches o.c., unless otherwise indicated.
- I. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
  1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
  2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
  3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

## 2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
  1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
  2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

## 2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
  - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
  - 2. Surfaces to be field welded.
  - 3. Surfaces to be high-strength bolted with slip-critical connections.
  - 4. Surfaces to receive sprayed fire-resistive materials.
  - 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
  - 1. SSPC-SP 2, "Hand Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
  - 2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.
- D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

## 2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/ A 123M.
  - 1. Fill vent holes and grind smooth after galvanizing.
  - 2. Galvanize lintels attached to structural-steel frame and located in exterior walls.

## 2.9 SOURCE QUALITY CONTROL

- A. Contractor will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
  - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
1. Liquid Penetrant Inspection: ASTM E 165.
  2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
  3. Ultrasonic Inspection: ASTM E 164.
  4. Radiographic Inspection: ASTM E 94.
- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:
1. Bend tests will be performed if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
  2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.
1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

#### 3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Load and Resistance Factor Design Specification for Structural Steel Buildings."
- B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
  2. Weld plate washers to top of base plate.

3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
  4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
1. Level and plumb individual members of structure.
  2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.
- G. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1.
- H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- I. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

### 3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Load and Resistance Factor Design Specification for Structural Steel Buildings" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
  2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
  3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
  4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

- a. Grind butt welds flush.
- b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.
  - 1. In addition to visual inspection, 10% of all fillet welds and 100% of all full-penetration moment welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:
    - a. Liquid Penetrant Inspection: ASTM E 165.
    - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
    - c. Ultrasonic Inspection: ASTM E 164.
    - d. Radiographic Inspection: ASTM E 94.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1 for stud welding and as follows:
  - 1. Perform bend tests if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
  - 2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

### 3.6 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
  - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
  - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

### END OF SECTION 051200

## **SECTION 054000 - COLD-FORMED METAL FRAMING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Exterior non-load-bearing wall framing.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For the following:
  - 1. Cold-formed steel framing materials.
  - 2. Exterior non-load-bearing wall framing.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Product certificates.
- B. Product test reports.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. CEMCO; California Expanded Metal Products Co.
  - 2. ClarkDietrich.
  - 3. MBA Metal Framing.

#### **2.2 COLD-FORMED STEEL FRAMING MATERIALS**

- A. Framing Members, General: Comply with ASTM C955 for conditions indicated.
- B. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
  - 1. Grade: As required by structural performance.
  - 2. Coating: G60, A60, AZ50, or GF30.

## 2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch.
  - 2. Flange Width: 1-3/8 inches.
  - 3. Section Properties: 50 KSI.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and matching minimum base-metal thickness of steel studs.

## 2.4 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated.

## 2.5 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.
- B. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 ICC-ES AC193 ICC-ES AC58 or ICC-ES AC308 as appropriate for the substrate.
  - 1. Uses: Securing cold-formed steel framing to structure.
  - 2. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 or Group 2 stainless steel bolts, ASTM F593, and nuts, ASTM F594.
- C. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
  - 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

## 2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A780/A780M MIL-P-21035B or **[SSPC-Paint 20]**.

Retain "Cement Grout" or "Nonmetallic, Nonshrink Grout" Paragraph below if concrete or masonry substrates require leveling before setting track or prefabricated assemblies.



- B. Cement Grout: Portland cement, ASTM C150/C150M, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C1107/C1107M, and with a fluid consistency and 30-minute working time.
- D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.
- E. Sill Sealer Gasket: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

## PART 3 - EXECUTION

### 3.1 PREPARATION

Retain first two paragraphs below if sprayed fire-resistive materials are required.

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.

Retain first paragraph below if bottom track of load-bearing walls requires a uniform-bearing surface on concrete or masonry construction.

- C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.

Retain paragraph below if sealing the gap between framing and concrete or masonry construction.

- D. Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

### 3.2 INSTALLATION, GENERAL

Retain this article with each specific framing classification in installation articles below.

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

- D. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- E. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- F. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

### 3.3 INSTALLATION OF EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to track unless otherwise indicated. Space studs as follows:
  - 1. Stud Spacing: As indicated on Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### 3.4 INSTALLATION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error are not to exceed minimum fastening requirements of sheathing or other finishing materials.

### 3.5 REPAIRS

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

**END OF SECTION 054000**

## 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 mechanical and electrical equipment.
  - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  - 3. Loose bearing and leveling plates.
  - 4. Steel weld plates and angles for casting into concrete not specified in other Sections.
  - 5. Miscellaneous steel trim.
- B. Products furnished, but not installed, under this Section include the following:
  - 1. Loose steel lintels.
  - 2. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
- C. Related Sections include the following:
  - 1. Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, wedge-type inserts and other items indicated to be cast into concrete.
  - 2. Division 04 Section "Unit Masonry" for installing loose lintels, anchor bolts, and other items indicated to be built into unit masonry.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Provide exterior metal fabrications 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 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.
3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

B. Welding certificates.

## 1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.6, "Structural Welding Code--Stainless Steel."

## 1.6 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 wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
2. Provide allowance for trimming and fitting at site.

## 1.7 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

## PART 2 - PRODUCTS

### 2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

## 2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304.
- C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- E. Rolled-Stainless-Steel Floor Plate: ASTM A 793.
- F. Abrasive-Surface Floor Plate: Steel plate with abrasive granules rolled into surface or with abrasive material metallurgically bonded to steel by a proprietary process.
  - 1. Products:
    - a. IKG Industries, a Harsco company; Mebac.
    - b. W. S. Molnar Company; SlipNOT.
- G. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- H. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- I. Slotted Channel Framing: Cold-formed metal channels with continuous slot complying with MFMA-3.
  - 1. Size of Channels: As indicated.
  - 2. Material: Galvanized steel complying with ASTM A 653/A 653M, structural steel, Grade 33, with G90 coating; 0.079-inch nominal thickness, unless indicated otherwise..
- J. Cast Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.

## 2.3 NONFERROUS METALS

- A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- E. Bronze Plate, Sheet, Strip, and Bars: ASTM B 36/B 36M, Alloy UNS No. C28000 (muntz metal, 60 percent copper).
- F. Bronze Extrusions: ASTM B 455, Alloy UNS No. C38500 (extruded architectural bronze).
- G. Bronze Castings: ASTM B 584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semi-red brass).

- H. Nickel Silver Extrusions: ASTM B 151/B 151M, Alloy UNS No. C74500.
- I. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

## 2.4 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.
- D. Anchor Bolts: ASTM F 1554, Grade 36.
  - 1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.
- E. Eyebolts: ASTM A 489.
- F. Machine Screws: ASME B18.6.3.
- G. Lag Bolts: ASME B18.2.1.
- H. Wood Screws: Flat head, ASME B18.6.1.
- I. Plain Washers: Round, ASME B18.22.1.
- J. Lock Washers: Helical, spring type, ASME B18.21.1.
- K. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
  - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.
- L. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
  - 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Material for Anchors in Exterior Locations: Stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

## 2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Division 09 painting Sections.
- C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
  - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- D. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
  - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Products:
    - a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
    - b. Carboline Company; Carbozinc 621.
    - c. ICI Devco Coatings; Catha-Coat 313.
    - d. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
    - e. PPG Architectural Finishes, Inc.; Aquapon Zinc-Rich Primer 97-670.
    - f. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.
    - g. Tnemec Company, Inc.; Tneme-Zinc 90-97.
- E. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- G. 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 3000 psi, unless otherwise indicated.

## 2.6 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 bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

- D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E. 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.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
  - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

## 2.7 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
  - 1. Fabricate units from slotted channel framing where indicated.
  - 2. Furnish inserts if units are installed after concrete is placed.
- C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
- D. Galvanize miscellaneous framing and supports where indicated.
- E. Prime miscellaneous framing and supports with zinc-rich primer where indicated.



## 2.8 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches, unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.
- D. Prime loose steel lintels located in exterior walls with zinc-rich primer.

## 2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates after fabrication.
- C. Prime plates with zinc-rich primer.

## 2.10 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete.

## 2.11 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
  - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize exterior miscellaneous steel trim and interior miscellaneous steel trim, where indicated.

## 2.12 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.

## 2.13 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
  - 1. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
  - 1. Exteriors (SSPC Zone 1B) 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, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," 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, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- 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. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

### 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 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.

### 3.4 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 dry film thickness.

**END OF SECTION 055000**

## SECTION 061000 - MISCELLANEOUS ROUGH CARPENTRY

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section includes roof curbs, blocking in wall and roof openings; wood furring and grounds; telephone and electrical panel back boards.

#### 1.2 REFERENCES

- A. ALSC (American Lumber Standards Committee) - Softwood Lumber Standards.
- B. APA/EWA (APA/Engineered Wood Association) - Certification.
- C. NFPA (National Forest Products Association) - Lumber Grading Rules.
- D. SPIB (Southern Pine Inspection Bureau) - Lumber Grading Rules.
- E. WCLIB (West Coast Lumber Inspection Bureau) - Lumber Grading Rules.
- F. WWPA (Western Wood Products Association) - Lumber Grading Rules.

#### 1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
  - 1. Lumber Grading Agency: Certified by ALSC.
  - 2. Plywood Grading Agency: Certified by APA/EWA.

#### 1.4 SUBMITTALS

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Lumber Grading Rules: SPIB.
- B. Miscellaneous Framing: No. 2 Southern Pine species, 19 percent maximum moisture content.
- C. Exterior Plywood Sheathing: APA Rated Sheathing, Structural I, 3/4" thick Plywood, Span Rating 16/32, Exposure Durability 1 Exterior; unsanded, fire preservative treated.
- D. Plywood for electrical & phone boards: APA/EWA Grade C-D 5/8 inch thick, 4 x 8 sheets

#### 2.2 ACCESSORIES

- A. Fasteners and Anchors:
  - 1. Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.

2. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

## PART 3 EXECUTION

### 3.1 FRAMING

- A. Set members level and plumb, in correct position.
- B. Place horizontal members, crown side up.
- C. Construct curb members of solid wood sections.
- D. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- E. Coordinate curb installation with installation of support for deck openings.

**END OF SECTION 061000**

## SECTION 061516 - WOOD ROOF DECKING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes glued-laminated wood roof decking

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Research/Evaluation Reports: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, from ICC-ES.

### PART 2 - PRODUCTS

#### 2.1 WOOD ROOF DECKING, GENERAL

- A. General: Comply with DOC PS 20 and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

#### 2.2 GLUED-LAMINATED WOOD ROOF DECKING

- A. Face Species: Southern pine.
- B. Roof Decking Nominal Size: 3 by 6.
- C. Decorative: Sound knots and natural characteristics are allowed, including chipped edge knots, short end splits, seasoning checks, and some pin holes. Face knot holes, stains, end slits, skips, roller splits, and planer burns are not allowed.
- D. Moisture Content: Provide wood roof decking with 15 percent maximum moisture content at time of dressing.
- E. Face Surface: Smooth.
- F. Edge Pattern: Vee grooved.
- G. Laminating Adhesive: Wet-use type complying with ASTM D2559.

#### 2.3 ACCESSORY MATERIALS

- A. Fastener Material: Hot-dip galvanized steel.

- B. Sealants: Latex, complying with applicable requirements in Section 079200 "Joint Sealants" and recommended by sealant manufacturer and manufacturer of substrates for intended application.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install laminated wood roof decking to comply with manufacturer's written instructions.
  - 1. Locate end joints for combination simple and two-span continuous lay-up or controlled random lay-up.
  - 2. Nail each course of glued-laminated wood roof decking at each support with one nail slant nailed above the tongue and one nail straight nailed through the face.
    - a. Use 16d nails for 3-by-6 roof decking.
  - 3. Slant nail each course of glued-laminated wood roof decking to the tongue of the adjacent course at spacing required in Structural drawings.
- B. Anchor wood roof decking, where supported on walls, with bolts as indicated.
- C. Apply joint sealant to seal roof decking at exterior walls at the following locations:
  - 1. Between roof decking and supports located at exterior walls.
  - 2. Between roof decking and exterior walls that butt against underside of roof decking.
  - 3. Between tongues and grooves of roof decking over exterior walls and supports at exterior walls.

### 3.2 PROTECTION

- A. Provide water-resistive barrier over roof decking as the Work progresses to protect roof decking until roofing is applied.

**END OF SECTION 061516**

## SECTION 071920 - FLUID-APPLIED MEMBRANE VAPOR BARRIERS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Vapor-permeable, fluid-applied vapor barriers.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For vapor-barrier assemblies.
  - 1. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Product test reports.
- C. Field quality-control reports.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Vapor-Barrier Performance: Vapor-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Vapor-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Vapor-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E2357.



## 2.2 FLUID APPLIED VAPOR BARRIERS, VAPOR PERMEABLE

- A. Fluid-Applied Vapor-Permeable Air Barrier: Synthetic material with an installed dry film thickness, according to manufacturer's written instructions, applied at a rate of 50-100 square feet per gallon.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Prosoco, Inc.
    - b. Hohmann & Barnard, Inc.
    - c. W.R. Meadows, Inc.
  - 2. Product standard shall be R-Guard Spray Wrap MVP by Prosoco.
  - 3. Physical and Performance Properties:
    - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E2178.
    - b. Vapor Permeance: Wet Cup 25 perms at 10 mils; ASTM E96.
    - c. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D4541.
    - d. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
    - e. UV Resistance: Can be exposed to sunlight for 180 days according to manufacturer's written instructions.

## 2.3 ACCESSORY MATERIALS

- A. Requirement: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

## PART 3 - EXECUTION

### 3.1 SURFACE PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.

- D. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- E. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- F. Bridge isolation joints, expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

### 3.2 INSTALLATION

- A. Install materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
  - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
  - 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
  - 3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
  - 4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
- B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- C. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
- D. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.
- E. Fluid-Applied Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply an increased thickness of air-barrier material in full contact around protrusions such as masonry ties.
  - 1. Vapor-Permeable, Low-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, applied in two equal coats one or more equal coats. Apply additional material as needed to achieve void- and pinhole-free surface, but do not exceed thickness on which required vapor permeability is based.
- F. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

### 3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Tests: As determined by testing agency from among the following tests:
  - 1. Air-barrier dry film thickness.
  - 2. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate according to ASTM E2357.
  - 3. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to ASTM D4541 for each 600 sq. ft. of installed air barrier or part thereof.
- C. Air barriers will be considered defective if they do not pass tests and inspections.
  - 1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
  - 2. Remove and replace deficient air-barrier components for retesting as specified above.
- D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- E. Prepare test and inspection reports.

### 3.4 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
- B. Remove masking materials after installation.

**END OF SECTION 071920**

## SECTION 072100 - THERMAL INSULATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Polyisocyanurate Board Insulation.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Polyisocyanurate Board Insulation.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research reports.

### PART 2 - PRODUCTS

#### 2.1 POLYISOCYANURATE BOARD INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 or 3.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Atlas Roofing Corporation.
    - b. Johns Manville; a Berkshire Hathaway company.
    - c. Owens Corning.
  - 2. Flame-Spread Index: Not more than 75 when tested in accordance with ASTM E84.
  - 3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
  - 4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

#### 2.2 ACCESSORIES

- A. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.

- B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. General Criteria:

1. Install the specified insulation per the required Windstorm Resistance Classification, to the insulation manufacturer and/or to the roofing systems manufacturer's written installation instructions.
2. Warped or bent insulation boards are not acceptable.
3. Stagger end joints of the insulation board layer a minimum of 1/3 of overall insulation board length.
4. Additional Layers of Flat Stock or Tapered Insulation: Two layers of insulation shall be installed when the thickness of the insulation exceeds 2.5 inches. Additional layers of insulation shall be laid transverse to the first layer, with joints staggered at least 1/3 of overall length from those of the first layer.
5. Insulation shall be neatly cut to fit around penetrations and projections.
6. Do not install more insulation board than can be covered with the specified roofing system by the end of the day, or onset of inclement weather.

#### B. Installation of the Polyisocyanurate Insulation over Wood Decks:

1. The specified insulation board, measuring a maximum of 4 feet x 8 feet in board size, shall be mechanically fastened to the wood decking with approved metal fasteners and plates.
2. Approved perimeter fastening of roof insulation shall be defined as the strip of roof area around the entire outside perimeter of the building having a width defined by the least of the following parameters: 1) 10% of the building length; 2) 10% of the building width; 3) 40% of the building eave height. The perimeter and corner widths shall not be less than eight (8') feet.
3. Approved field fastening pattern of insulation panels, which fall outside the insulation corner and perimeter attachment areas of the building, shall be fastened a minimum rate of one fastener for every 5.33 square feet (a minimum of 6 fasteners and plates per 4' x 8' sheet); or according to the insulation manufacturer's requirements, whichever is more stringent. Increasing the fastening pattern of the insulation panels for the perimeters of the roof by 25 percent (a minimum of 8 fasteners and plates per 4' x 8' insulation board size.). In the corners of the roof, the fastening pattern of the insulation panels shall be increased by 50 percent (a minimum of 12 fasteners and plates per 4' x 8' insulation board size.).
4. Fasteners are to have a maximum of 2 3/8 inch and a minimum 2-inch penetration into the wood decking.
5. Use fastener tools with a depth locator to ensure proper installation and ensure fasteners are not visible from underside of deck.

## END OF SECTION 072100

## **SECTION 072119 - FOAMED-IN-PLACE INSULATION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Open-cell spray polyurethane foam.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Product test reports.
- B. Research reports.

### **PART 2 - PRODUCTS**

#### **2.1 OPEN-CELL SPRAY POLYURETHANE FOAM**

- A. Open-Cell Spray Polyurethane Foam: Spray-applied polyurethane foam using water as a blowing agent. Minimum density of 0.4 lb/cu. ft. and minimum aged R-value at 1-inch thickness of 3.4 deg F x h x sq. ft./Btu at 75 deg F.
  - 1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
  - 2. Fire Propagation Characteristics: Passes NFPA 285 and NFPA 276 testing as part of an approved assembly.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Spray insulation to fill all non-grouted cells in exterior CMU wall construction and leave no voids.

**END OF SECTION 072119**

## SECTION 074113 - STANDING-SEAM METAL ROOF PANELS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Standing-seam metal roof panels.

#### 1.2 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.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Warranties: Sample of special warranties.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

#### 1.6 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: 10 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 E1680 or ASTM E283 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- B. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E1646 or ASTM E331 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- C. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E2140.
- 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. 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, material surfaces.

### 2.2 STANDING-SEAM METAL ROOF PANELS

- A. 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.
  - 1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E1514.
  - 2. Aluminum Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E1637.



- B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced 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 mechanically seaming panels together.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Drexel Metals.
  2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
    - a. Nominal Thickness: 24 gauge.
    - b. Exterior Finish: Three-coat fluoropolymer.
    - c. Color: Match color of panels at adjacent Concessions Building.
    - d. Product DMC 450SL Profile, Flat Panel option.
  3. Clips: One-piece fixed to accommodate thermal movement.
    - a. Material: 0.064-inch- nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
  4. Joint Type: Double folded.
  5. Panel Coverage: 15.25" .
  6. Panel Height: 2.0 inches.
  7. Product Standard to be 2" Field-Lok by ATAS.

## 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. Thermal Stability: Stable after testing at 240 deg F; ASTM D1970.
  2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970.
- B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

## 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-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. 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, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Rigid Insulation: As specified in Section 075423, and in thickness shown on Drawings.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch wide and 1/8 inch thick.
  2. Joint Sealant: ASTM C920; as recommended in writing by metal panel manufacturer.
  3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

## 2.5 FABRICATION

- A. 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. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. 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. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat.

2. Concealed Finish: White or light-colored acrylic or polyester backer finish.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

### 3.2 INSTALLATION OF UNDERLAYMENT

- 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.
- B. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels if required by Manufacturer.
- C. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

### 3.3 INSTALLATION OF STANDING SEAM METAL ROOF PANELS

- 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. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
  4. Watertight Installation:
    - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
    - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
    - c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- 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**

## SECTION 074213 - FORMED METAL WALL PANELS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Concealed-fastener, lap-seam metal wall panels.
  - 2. Standing-seam metal wall panels.

#### 1.2 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.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Warranties: Samples of special warranties.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

#### 1.6 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.

## 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 E283 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft.
- B. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft.
- C. 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, material surfaces.
- D. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

### 2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.
- B. Preformed Steel Siding: Wood-look panels with concealed fastening system.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. MAC Metal Architectural, a division of Acme Brick.
  - 2. Product Information:
    - a. Panel profile: Harrywood.
    - b. Material: 26 gauge Steel .
    - c. Exterior Finish: 70% PVDF.
    - d. Color: Match adjacent Concessions Building.

## 2.3 STANDING-SEAM METAL WALL PANELS

- A. Provide factory-formed metal roof panel assembly designed to be installed by covering vertical side edges of adjacent panels with battens and mechanically attaching panels to supports using concealed clips. Include battens and accessories required for weathertight installation.
  - 1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E1514.
  - 2. Aluminum Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E1637.
- B. Vertical-Rib, Snap-Joint, Standing-Seam Metal Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced a flat pan between ribs.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Drexel Metals.
  - 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
    - a. Nominal Thickness: 24 gauge.
    - b. Exterior Finish: Three-coat fluoropolymer.
    - c. Color: Match adjacent Concessions Building.
    - d. Product: Match Standing Seam Metal Roof Panels.
  - 3. Clips: One-piece fixed to accommodate thermal movement.
    - a. Material: 0.064-inch- nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
  - 4. Joint Type: Standing Seam battens snapped over clips and panels.
  - 5. Panel Coverage: 15.25" .
  - 6. Panel Height: 1.0 inches.
  - 7. Product Standard shall be PC System by ATAS.

## 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 rakes, fabricated of same metal as metal panels.
  - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
- B. 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, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels. Outside corners shall be factory formed mitered corners.

- C. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- D. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
  - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch wide and 1/8 inch thick.
  - 2. Joint Sealant: ASTM C920; as recommended in writing by metal panel manufacturer.
  - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

## 2.5 FABRICATION

- A. 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. 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 polyvinylidene fluoride (PVDF) resin by weight in color coat.
  - 2. Concealed Finish: Manufacturer's standard.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Substrate: ensure substrate is properly installed and secured to structure, and ready to receive metal panels.
- B. Air and Vapor Barrier: ensure air and vapor barrier is properly applied for a continuous weather barrier.



### 3.2 INSTALLATION

- A. General Metal Panel Installation: Fasten metal panels to substrate with fasteners at each lapped joint at location and spacing recommended by manufacturer.
  - 1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
  - 2. Install panels horizontally in accordance with Manufacturer's written instructions.
  - 3. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels.
  - 4. Flash and seal panels with weather closures at perimeter of all openings.
- B. Watertight Installation:
  - 1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
  - 2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
  - 3. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- D. 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 are permanently watertight.

### 3.3 CLEANING

- 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 074213**

## SECTION 076200 - SHEET METAL FLASHING AND TRIM

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Manufactured reglets with counterflashing.
  - 2. Formed low-slope roof sheet metal fabrications.
  - 3. Formed wall sheet metal fabrications.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product
- B. Shop Drawings: For sheet metal flashing and trim.
  - 1. Include plans, elevations, sections, and attachment details.
  - 2. Distinguish between shop- and field-assembled work.
  - 3. Include identification of finish for each item.
  - 4. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.
- C. Samples: For each exposed product and for each color and texture specified, 12 inches long by actual width.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of coping and roof edge flashing that is ANSI/SPRI/FM 4435/ES-1 tested and FM Approvals approved.
- B. Evaluation Reports: For copings and roof edge flashing, from an agency acceptable to authority having jurisdiction showing compliance with ANSI/SPRI/FM 4435/ES-1.
- C. Sample warranty.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Special warranty.

## 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
  - 1. For copings and roof edge flashings that are ANSI/SPRI/FM 4435/ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

## 1.6 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Delta units when tested in accordance with ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the design pressure adopted by local building code.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent 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: 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- A. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet in accordance with ASTM A792/A792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A755/A755M.
  - 1. Surface: Smooth, flat.
  - 2. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 3. Color: As selected by Architect.
  - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

## 2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
  - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
    - b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
    - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
  - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
  - 3. Fasteners for Zinc-Coated (Galvanized) Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

- D. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.
- G. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.
- H. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.

## 2.4 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
  - 1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
  - 2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  - 3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
  - 4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
  - 5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances:
  - 1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
  - 2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
  - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
  - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.

- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- G. Seams:
  - 1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
  - 2. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
  - 3. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

## 2.5 ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing and Fascia Cap: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long sections. Furnish with 6-inch-wide, joint cover plates. Shop fabricate interior and exterior corners.
  - 1. Fabricate from the following materials:
    - a. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

## 2.6 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:
  - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
  - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
  - 2. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 3. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
  - 4. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
  - 5. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.

6. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
  7. Do not field cut sheet metal flashing and trim by torch.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of uncoated-aluminum and stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
  2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
  2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
  3. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated.
  2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

### 3.2 INSTALLATION OF ROOF FLASHINGS

- A. Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.
1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
  2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing:
1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
  2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.
- C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless steel draw band and tighten.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.
  1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.
  2. Extend counterflashing 4 inches over base flashing.
  3. Lap counterflashing joints minimum of 4 inches.
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof.

### 3.3 INSTALLATION OF WALL FLASHINGS

- A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

### 3.4 INSTALLATION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### 3.5 CLEANING

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.

### 3.6 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

## END OF SECTION 076200



## SECTION 079200 - JOINT SEALERS

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section includes sealants and joint backing, precompressed foam sealers, hollow gaskets and accessories.

#### 1.2 REFERENCES

- A. American Society for Testing and Materials:
  - 1. ASTM C834 - Latex Sealing Compounds.
  - 2. ASTM C919 - Practice for Use of Sealants in Acoustical Applications.
  - 3. ASTM C920 - Elastomeric Joint Sealants.
  - 4. ASTM C1193 - Guide for Use of Joint Sealants.
  - 5. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
  - 6. ASTM D1565 - Flexible Cellular Materials--Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).
  - 7. ASTM D1667 - Flexible Cellular Materials--Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
  - 8. ASTM D2628 - Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.

#### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Samples: Submit samples illustrating sealant colors for selection.
- D. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.
- E. Warranty: Include coverage for installed sealants and accessories failing to achieve airtight seal, watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

#### 1.4 QUALITY ASSURANCE

- A. Maintain one copy of each referenced document covering installation requirements on site.

#### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

- B. Applicator: Company specializing in performing Work of this section with minimum three years experience and approved by manufacturer.

## 1.6 MOCKUP

- A. Section 014000 - Quality Requirements: Requirements for mockup.
- B. Construct mockup of sealant joints in conjunction with window, wall, and doors mockups specified in other sections.
- C. Construct mockup with specified sealant types and with other components noted.
  - 1. Determine preparation and priming requirements based on manufacturers recommendations; take action necessary for correction of failure of sealant tests on mock-up.
  - 2. Verify sealants, primers, and other components do not stain adjacent materials.
- D. Locate where directed by Architect/Engineer.
- E. Incorporate accepted mockup as part of Work.
- F. Remove mockup when directed by Architect/Engineer.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Products Requirements.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

## 1.8 COORDINATION

- A. See Section 013100 – Project Management and Coordination: Coordination and project conditions.
- B. Coordinate Work with sections referencing this section.

## PART 2 PRODUCTS

### 2.1 JOINT SEALERS

- A. Manufacturers:
  - 1. Dow Corning Corp.
  - 2. GE Silicones.
  - 3. Illbruck Sealant Systems.
  - 4. Mameco International Inc.
  - 5. Pecora Corp.
  - 6. Sika Corp.
  - 7. Sonneborn.
  - 8. Substitutions: Section 016000 - Products Requirements.

B.

Products Description:

1. High Performance General Purpose Exterior (Nontraffic) Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single component.
  - a. Color: Colors as selected.
  - b. Applications: Use for:
    - 1) Control, expansion, and soft joints in masonry.
    - 2) Joints between concrete and other materials.
    - 3) Joints between metal frames and other materials.
    - 4) Other exterior nontraffic joints for which no other sealant is indicated.
2. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, non-drying, non-skinning, non-curing.
  - a. Applications: Use for concealed sealant bead in sheet metal work and concealed sealant bead in siding overlaps.
3. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, single component, paintable.
  - a. Color: Colors as selected by Architect.
  - b. Applications: Use for interior wall and ceiling control joints and other interior joints for which no other type of sealant is indicated.
4. Bathtub/Tile Sealant: Silicone; ASTM C920, Uses M and A; single component, mildew resistant.
  - a. Applications: Use for joints between plumbing fixtures and floor and wall surfaces, and joints between toilet room counter tops and wall surfaces.
5. Acoustical Sealant: Butyl or acrylic sealant; ASTM C920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
  - a. Applications: Use for concealed locations only at acoustically rated construction.
    - 1) Provide sealant bead between top stud runner and structure and between bottom stud track and floor.
    - 2) Sealant bead between ceiling material and wall material.
6. Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C920, Grade P, Class 25, Uses T, M and A; Multi-component.
  - a. Approved by manufacturer for wide joints up to 1-1/2 inches.
  - b. Color as selected.
  - c. Applications: Use for: Expansion joints in floors and Control joints in floor.
  - d. Shore hardness of 80 (in truck area only).

7. Type S – Silicone Sealant: C920, Grade NS, Class 25, Uses NT, A; single component, acid curing for nonporous material bonding; non-acid curing for porous surfaces, non-sagging, non-staining, fungus resistant, non-bleeding.
  - a. Color as selected.
  - b. Movement Capability: 100 percent, minus 25 percent.
  - c. Service Temperature Range: 77 degrees F.
  - d. Shore A Hardness Range: 15 to 35.
  - e. Applications: Use for exterior windows, doors, frames, etc. and interior door frames, windows, etc.
8. Precompressed, Self-expanding polyurethane foam joint sealant: Willseal 600 by Illbruck Sealant Systems, open cell polyurethane flexible foam impregnated with flame retardant modified acrylic.
  - a. Color: Black
  - b. Width: Determined by width of joint to be sealed.
  - c. Applications: Use in locations shown on Drawings and miscellaneous joints where gun-applied sealant use is not practical.

## 2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. See Section 013100 – Project Management and Coordination: Coordination and project conditions.
- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint backing and release tapes are compatible with sealant.

### 3.2 PREPARATION

- A. Remove loose materials and foreign matter impairing adhesion of sealant.
- B. Clean and prime joints.
- C. Perform preparation in accordance with ASTM C1193.

- D. Protect elements surrounding Work of this section from damage or disfiguration.

### 3.3 INSTALLATION

- A. Perform installation in accordance with ASTM C1193.
- B. Perform acoustical sealant application work in accordance with ASTM C919.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by Manufacturer.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.
- H. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.
- I. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

### 3.4 CLEANING

- A. Section 017300 - Execution: Final cleaning.
- B. Clean adjacent soiled surfaces.

### 3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017300 - Execution: Protecting installed construction.
- B. Protect sealants until cured.

### 3.6 SCHEDULE

Not Used.

**END OF SECTION 079200**

## **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. Interior standard steel doors and frames.
  - 2. Exterior standard steel doors and frames.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: Include the following:
  - 1. Elevations of each door type.
  - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
  - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
- C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Product test reports.
- B. Field quality control reports.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Ceco Door; ASSA ABLOY.
  - 2. Curries Company; ASSA ABLOY.
  - 3. Steelcraft; an Allegion brand.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.10 when tested according to ASTM C518.

### 2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B..
  - 1. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches.
    - c. Face: steel sheet, minimum thickness of 0.042 inch.
    - d. Edge Construction: Model 2, Seamless.
    - e. Core: Manufacturer's standard.
    - f. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.
  - 2. Frames:
    - a. Materials: steel sheet, minimum thickness of 0.053 inch.
    - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
    - c. Construction: Full profile welded.

### 2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B..
  - 1. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches.

- c. Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch, with minimum A60 coating.
  - d. Edge Construction: Model 2, Seamless.
  - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
  - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
  - g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
  - h. Core: Manufacturer's standard.
  - i. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.
2. Frames:
- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
  - b. Construction: Full profile welded.

## 2.5 FRAME ANCHORS

- A. Jamb Anchors:
- 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
  - 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
  - 3. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.
- D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
- 1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

## 2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.



- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
- G. Glazing: Comply with requirements in Section 088000 "Glazing."

## 2.7 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
  - 1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 2. Door Silencers: Except on weather-stripped frames, 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.
- B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
  - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  - 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

## 2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
  - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## PART 3 - EXECUTION

### 3.1 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. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

### 3.2 INSTALLATION

#### A. Hollow-Metal Frames: 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 without damage to completed Work.
  - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
  - b. Install frames with removable stops located on secure side of opening.
2. Floor Anchors: Secure with postinstalled expansion anchors.
  - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Solidly pack mineral-fiber insulation inside frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
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. Installation Tolerances: Adjust hollow-metal frames 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.

#### B. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.

#### C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

### 3.3 REPAIR

- A. 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.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

### END OF SECTION 081113

## SECTION 087100 - FINISH HARDWARE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Door Hardware.
  - 2. Cylinders for doors fabricated with locking hardware.
- B. Related Sections:
  - 1. Section 079200 – Joint Sealers – exterior thresholds.
  - 2. Section 081113 – Standard Steel Doors and Frames.

#### 1.2 REFERENCES:

- A. Use date of standard in effect as of Bid date.
- B. American National Standards Institute – ANSI 156.18 – Materials and Finishes.
- C. ICC/ANSI A117.1 - 1998 – Specifications for making buildings and facilities usable by physically handicapped people.
- D. ADA – Americans with Disabilities Act of 1990
- E. BHMA – Builders Hardware Manufacturers Association
- F. DHI – Door and Hardware Institute
- G. NFPA – National Fire Protection Association
  - 1. NFPA 80 – Fire Doors and Windows
  - 2. NFPA 101 – Life Safety Code
  - 3. NFPA 105 – Smoke and Draft Control Door Assemblies
  - 4. NFPA 252 – Fire Tests of Door Assemblies
- H. UL – Underwriters Laboratories
  - 1. UL10B – Fire Tests of Door Assemblies as amended to incorporate positive pressure testing.
  - 2. UL 305 – Panic Hardware
- I. WHI – Warnock Hersey Incorporated
- J. Local applicable codes

- K. SDI – Steel Door Institute
- L. AWI – Architectural Woodwork Institute
- M. NAAMM – National Association of Architectural Metal Manufacturers

### 1.3 SUBMITTALS & SUBSTITUTIONS

- A. SUBMITTALS: Submit copies of schedule per Division 1. Organize vertically formatted schedule into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
  - 1. Type, style, function, size, quantity and finish of hardware items. Use BHMA Finish codes per ANSI A156.18.
  - 2. Name, part number and manufacturer of each item.
  - 3. Fastenings and other pertinent information.
  - 4. Location of hardware set coordinated with floor plans and door schedule.
  - 5. Explanation of abbreviations, symbols, and codes contained in schedule.
  - 6. Mounting locations for hardware.
  - 7. Door and frame sizes, materials and degrees of swing.
  - 8. List of manufacturers used and their nearest representative with address and phone number.
  - 9. Catalog cuts.
  - 10. Manufacturer's technical data and installation instructions for electronic hardware.
  - 11. Date of jobsite visit.
- B. Bid and submit manufacturer's updated/improved item if scheduled item is discontinued.
- C. Make substitution requests in accordance with Division 1. Include product data and indicate benefit to the Project. Furnish operating samples on request.
  - 1. Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.
- D. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, wiring/riser diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

### 1.4 QUALITY ASSURANCE:

- A. Qualifications:
  - 1. Hardware supplier: direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course Work for project hardware consultation to Owner, Architect and Contractor.
    - a. Responsible for detailing, scheduling and ordering of finish hardware.
- B. Hardware: New, free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.

- C. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- D. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions.
  - 1. Where scheduled item is now obsolete, bid and furnish manufacturer's updated item at no additional cost to the project.

#### 1.5 DELIVERY, STORAGE AND HANDLING:

- A. Delivery: coordinate delivery to appropriate locations (shop or field).
  - 1. Permanent keys and cores: secured delivery direct to Owner's representative.
- B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
- C. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

#### 1.6 PROJECT CONDITIONS:

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical as the same operation and quality as type specified, subject to Architect's approval.

#### 1.7 SEQUENCING AND COORDINATION:

- A. Coordinate with concrete.
- B. Reinforce walls for wall-mounted hardware, including wall stops and stainless steel guard rails.
- C. Coordinate finish floor materials and floor-mounted hardware.
- D. Furnish manufacturer templates to door and frame fabricators.
  - 1. Ensure proper reinforcement in metal doors and frames to support machine screws for panic hardware and door closers.
- E. Use hardware consultant to check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.
  - 1. Confirm that wood door manufacturers furnish necessary UBC Standard 7-2 compliant seal packages.

#### 1.8 WARRANTY:

- A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' warranties:
  - 1. Locksets: Three years.

- |    |                 |                                              |
|----|-----------------|----------------------------------------------|
| 2. | Exit Devices:   | Three years mechanical, one year electrical. |
| 3. | Closers:        | Ten years mechanical, two years electrical.  |
| 4. | Hinges:         | Two years.                                   |
| 5. | Other Hardware: | Two years.                                   |

1.9 COMMISSIONING:

- A. Conduct these tests three weeks prior to request for certificate of substantial completion
- B. Test door hardware operation with climate control system both at rest and while in full operation.

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

Listed acceptable alternate manufacturers: submit for review products with equivalent function and features of scheduled products.

| <u>ITEM:</u>             | <u>MANUFACTURER:</u> | <u>ACCEPTABLE SUB:</u> |
|--------------------------|----------------------|------------------------|
| Hinges                   | (IVE) Ives           | Hager, McKinney        |
| Key System               | (SC) Schlage         | Owner's Standard       |
| Locks                    | (BES) Best           | Owner's Standard       |
| Exit Devices             | (V) Von Duprin       | Owner's Standard       |
| Closers                  | (L) LCN              | Owner's Standard       |
| Silencers                | (IVE) Ives           | Hager, Rockwood        |
| Stops & Holders –        | (IVE) Ives           | Hager, Rockwood        |
| Overhead Stops           | (GJ) Glynn-Johnson   | None available         |
| Thresholds               | (NGP) National Guard | Zero, Reese            |
| Seals & Bottoms          | (NGP) National Guard | Zero, Reese            |
| Push, Pull, & Kickplates | (IVE) Ives           | Hager, Rockwood        |
| Aluminum Door Locks      | (ADA) Adams Rite     | None                   |

2.2 HINGING METHODS:

- A. Note: drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.
- B. Conventional Hinges: Steel or stainless steel pins and concealed bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.
  - 1. Three hinges per leaf to 7 foot, 6 inch height. Add one for each additional 30 inches in height, or any fraction thereof.
  - 2. Extra heavy weight hinges on doors over 3 foot, 5 inches in width.
  - 3. Extra-heavy weight hinges on doors with panic hardware or fire exit devices.
  - 4. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins.
  - 5. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.
  - 6. Provide shims and shimming instructions for proper door adjustment.

## 2.3 LOCKSETS, LATCHSETS, DEADBOLTS:

### A. Extra Heavy Duty Cylindrical Locks and Latches: as scheduled.

1. Chassis: cylindrical design, corrosion-resistant plated cold-rolled steel, through-bolted.
2. Locking Spindle: stainless steel, interlocking design.
3. Latch Retractors: forged steel. Balance of inner parts: corrosion-resistant plated steel, or stainless steel.
4. Backset: 2-3/4" typically, more or less as needed to accommodate frame, door or other hardware.
5. Lever Trim: accessible design, independent operation, spring-cage supported, minimum 2" clearance from lever mid-point to door face.
6. Electric operation: Manufacturer-installed continuous duty solenoid.
7. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
8. Lock Series and Design: Coordinate with Owner's standard keying.
9. Certifications:
  - a. ANSI A156.2, 1994, Series 4000, Grade 1.
  - b. UL listed for A label and lesser class single doors up to 4ft x 8ft.
10. Accepted substitutions: NONE

## 2.4 EXIT DEVICES / PANIC HARDWARE

### A. General features:

1. Independent lab-tested 1,000,000 cycles.
2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
3. 0.75-inch throw deadlocking latchbolts.
4. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
5. No exposed screws to show through glass doors.
6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
7. Releasable in normal operation with 15-lb. maximum operating force per UBC Standard 10-4, and with 32 lb. maximum pressure under 250-lb. load to the door.
8. Flush end cap design as opposed to typical "bottle-cap" design end cap.

### A. Specific features:

1. Non-Fire Rated Devices: cylinder dogging.
2. Lever Trim: Breakaway type, forged brass or bronze escutcheon min .130" thickness, compression spring drive, match lockset lever design.
3. Fire-Labeled Devices: UL label indicating "Fire Exit Hardware". Rim latching device unless otherwise scheduled.
4. Impact recessed devices: 1-1/4inch projection when push-pad is depressed. Sloped metal end caps to deflect carts, etc. No pinch points to catch skin between touchbar and door.
5. Delayed Egress Devices: Function achieved within single exit device component, including latch, delayed locking device, request-to-exit switch, nuisance alarm, remote alarm, key switch, indicator lamp, relay, internal horn, door position input,

external inhibit input plus fire alarm input. NFPA 101 "Special Locking Arrangement" compliant.

6. Acceptable products: Von Duprin 99 Series rim latching devices.

## 2.5 CLOSERS

### A. Surface Closers:

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date-of-manufacture code.
3. Independent lab-tested 10,000,000 cycles.
4. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. Opening pressure: Exterior doors 8.5 lb., interior doors 5 lb., labeled fire doors 15 lb.
7. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
8. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
9. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
10. Exterior doors do not require seasonal adjustments in temperatures from 120 degrees F to -30 degrees F, furnish data on request.
11. Non-flaming fluid, will not fuel door or floor covering fires.
12. Pressure Relief Valves (PRV): unsafe, not permitted.
13. Acceptable products: LCN 4040 Series

## 2.6 OTHER HARDWARE

- A. Automatic Flush Bolts: Low operating force design, "LBR" type where scheduled.
- B. Overhead Stops: Stainless steel (100 series). Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- C. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
- D. Door Stops: Provide stops to protect walls, casework or other hardware.
  1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
  2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.
- E. Seals: Finished to match adjacent frame color. Resilient seal material: polypropylene, nylon brush, or solid high-grade neoprene. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material's thickness and durability. Proposed substitutions: submit for approval.



1. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
  2. Non-corroding fasteners at in-swinging exterior doors.
  3. Sound control openings: Use components tested as a system using nationally accepted standards by independent laboratories. Ensure that the door leafs have the necessary sealed-in-place STC ratings. Adhesive mounted components not acceptable. Fasten applied seals over bead of sealant.
  4. Fire-rated Doors, Resilient Seals: UL10C / UBC Standard 7-2 compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.
  5. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C / UBC Standard 7-2. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required.
- F Automatic door bottoms: low operating force units. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.
- G. Thresholds: As scheduled and per details. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
1. Exteriors: Seal perimeter to exclude water and vermin. Use butyl-rubber or polyisobutylene sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
  2. Fire-rated openings, 90min or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, request direction from Architect.
  3. Fire-rated openings, 3hour duration: Thresholds, where scheduled, to extend full jamb depth.
  3. Acoustic openings: Set units in full bed of Division-7-compliant butyl-rubber or polyisobutylene sealant, leave no air space between threshold and substrate.
  4. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
- H. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.
- I. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.

## 2.7 FINISH:

- A. Generally BHMA 626 Satin Chromium. Match finish of existing hardware otherwise.
  - 1. Areas using BHMA 626 to have push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.
- B. Door closers: factory powder coated to match other hardware, unless otherwise noted.
- C. Aluminum items: match predominant adjacent material. Seals to coordinate with frame color.

## 2.8 KEYING REQUIREMENTS:

- A. Key System: existing small format interchangeable core. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner to determine system structure and keybow styles, furnish Owner's written approval of the system.
  - 1. Construction keying: furnish keyed-alike temporary cores plus 10 operating keys. Temporary cores and keys remain property of hardware supplier
- B. Interchangeable Cores: 7-pin solid brass construction.
- C. Permanent cores: furnish factory-keyed.
  - 1. Locksets and cylinders same manufacturer.
- D. Permanent cores: furnish factory-keyed.
- E. Permanent keys and cores: use secured shipment direct from point of origination to Owner.
- F. Bitting List: use secured shipment direct from point of origination to Owner upon completion.

## PART 3 - EXECUTION

### 3.1 ACCEPTABLE INSTALLERS:

- A. Experienced craftsperson with a resume of successful projects. Can readily differentiate between number 2 and number 3 phillips-drive screws and screwdrivers. Can readily differentiate between #10-24 machine screws and drywall screws, and can explain correct usages of these items.

### 3.2 PREPARATION:

- A. Ensure that walls and frames are square and plumb before hardware installation.
- B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
  - 1. Notify Architect of any code conflicts before ordering material.

2. Locate levers, key cylinders, t-turn pieces, touchbars and other operable portions of latching hardware between 30 inches to 44 inches above the finished floor.
  3. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.
- C. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.
- D. Existing frames and doors scheduled to receive new hardware: carefully remove existing hardware, tag and bag, and turn over to Owner.
1. Patch and fill wood frames and doors with solid wood dutchments before cutting for new hardware. Do not reuse existing screw holes - - fill with dowel plugs and re-pilot.
  2. Metal doors/frames: Weld or fasten with screws: filler pieces in existing hardware cut-outs and mortises not scheduled for re-use by new hardware. Leave surfaces smooth - - no applied patches.
  3. Remove unused existing floor closers, fill empty floor closer cavities with concrete.

### 3.3 INSTALLATION

- A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.
1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
  2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
  3. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
  4. Replace fasteners damaged by power-driven tools.
- B. Locate floor stops no more that 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.
- C. Locate overhead stops for minimum 90 degrees and maximum allowable degree of swing.
- D. Drill pilot holes for fasteners in wood doors and/or frames.
- E. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to Owner items not scheduled for reuse.

### 3.4 ADJUSTING

- A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
  - 1. Hardware damaged by improper installation or adjustment methods to be repaired or replaced to Owner's satisfaction.
  - 2. Adjust doors to fully latch with no more than 1 pound of pressure.
  - 3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
- B. Inspection: Use hardware supplier. Include supplier's report with closeout documents.
- C. Follow-up inspection: Installer to provide letter of agreement to Owner that approximately 6 months after substantial completion, installer will visit Project with representatives of the manufacturers of the locking devices and door closers to accomplish following:
  - 1. Re-adjust hardware.
  - 2. Evaluate maintenance procedures and recommend changes or additions, and instruct Owner's personnel.
  - 3. Identify items that have deteriorated or failed.
  - 4. Submit written report identifying problems and likely future problems.

### 3.5 PROTECTION/CLEANING:

- A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.
- B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

### 3.6 SCHEDULE OF FINISH HARDWARE

- A. See schedule in drawings for hardware set assignments.

**END OF SECTION 087100**

## SECTION 099113 - EXTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on exterior substrates.

#### 1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of paint system and each color and gloss of topcoat.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Benjamin Moore & Co.
  - 2. Dunn-Edwards Corporation.
  - 3. Sherwin-Williams Company (The).

## 2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be 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, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range.

## 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 the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Masonry (Clay and CMUs): 12 percent.
  - 3. Wood: 15 percent.
  - 4. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems 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. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Surfaces: Correct defects and clean surfaces capable of affecting work of this section. Remove or repair existing coatings exhibiting surface defects.
- D. Marks: Seal with shellac those that may bleed through surface finishes.

- E. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- F. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- G. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.
- H. Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior caulking compound after sealer has been applied.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
- B. Apply paints 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.

### 3.4 CLEANING AND PROTECTION

- A. 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.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.5 EXTERIOR PAINTING SCHEDULE

- A. Wood Substrates:
  - 1. Stain, Exterior, Water Based, polyurethane transparent stain for new wood surfaces:
    - a. Prime Coat: Stain, water based, semitransparent, matching topcoat.
    - b. Intermediate Coat: Stain, water based, semitransparent, matching topcoat.
    - c. Topcoat: Polyurethane, solvent based, transparent low sheen, fire-resistant properties to achieve a Class C rating (Flame Spread of 200 max., and Smoke Spread of 450 max.).
- B. Steel and Iron Substrates:
  - 1. Water-Based Light Industrial Coating System:
    - a. Prime Coat: Primer, rust inhibitive, water based.
    - b. Prime Coat: Shop primer specified in Section where substrate is specified.

- c. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
- d. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5).

C. Galvanized-Metal Substrates:

- 1. Water-Based Light Industrial Coating System:
  - a. Prime Coat: Primer, galvanized, water based.
  - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
  - c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5).

**END OF SECTION 099113**



## SECTION 099123 - INTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates.

#### 1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples: For each type of paint system and in each color and gloss of topcoat.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Benjamin Moore & Co.
  - 2. Dunn-Edwards Corporation.
  - 3. Sherwin-Williams Company (The).

## 2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be 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, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range.

## 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 the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Masonry (Clay and CMUs): 12 percent.
  - 3. Wood: 15 percent.
  - 4. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems 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. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Surfaces: Correct defects and clean surfaces capable of affecting work of this section. Remove or repair existing coatings exhibiting surface defects.
- D. Marks: Seal with shellac those that may bleed through surface finishes.

- E. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- F. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- G. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.
- H. Interior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior caulking compound after sealer has been applied.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply paints 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.

### 3.4 CLEANING AND PROTECTION

- A. 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.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.5 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
  - 1. High-Performance Architectural Latex System:
    - a. Prime Coat: Primer, alkali resistant, water based.
    - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
    - c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 2).
- B. Concrete Substrates, Traffic Surfaces:
  - 1. Water-Based Concrete Floor Sealer System:
    - a. First Coat: Sealer, water based, for concrete floors, matching topcoat.
    - b. Topcoat: Sealer, water based, for concrete floors.

C. CMU Substrates:

1. High-Performance Architectural Latex System:
  - a. Block Filler: Interior/exterior latex block filler.
  - b. Prime Coat: Alkali-resistant, water-based primer.
  - c. Intermediate Coat: Matching topcoat.
  - d. Topcoat: Interior, latex, high-performance architectural coating, satin.
- 2.

D. Steel Substrates:

1. High-Performance Architectural Latex System:
  - a. Prime Coat: Primer, alkyd, anti-corrosive, for metal.
  - b. Prime Coat: Shop primer specified in Section where substrate is specified.
  - c. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
  - d. Topcoat: Latex, interior, high performance architectural semi-gloss (MPI Gloss Level 5).

E. Galvanized-Metal Substrates:

1. High-Performance Architectural Latex System:
  - a. Prime Coat: Primer, galvanized, water based.
  - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
  - c. Topcoat: Latex, interior, high performance architectural semi-gloss (MPI Gloss Level 5).

F. Wood Substrates: Wood trim, Architectural woodwork and wood board paneling.

1. Transparent Stain System:
  - a. Prime Coat: Stain, water based, semitransparent, matching topcoat.
  - b. Intermediate Coat: Stain, water based, semitransparent, matching topcoat.
  - c. Topcoat: Polyurethane, solvent based, transparent low sheen, fire-resistant properties to achieve a Class C rating (Flame Spread of 200 max., and Smoke Spread of 450 max.).

G. Plastic Substrates:

1. High-Performance Architectural Latex System:
  - a. Prime Coat: Primer, bonding, solvent based.
  - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
  - c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 4).

**END OF SECTION 099123**

## SECTION 099600 - HIGH-PERFORMANCE COATINGS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of high-performance coating systems.

#### 1.2 DEFINITIONS

- A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- B. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- C. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of coating system and in each color and gloss of topcoat indicated.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Benjamin Moore & Co.
  - 2. Sherwin-Williams Company (The).
  - 3. Tnemec Company, Inc.

#### 2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be 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, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
  3. Products shall be of same manufacturer for each coat in a coating system.
- C. Colors: As selected by Architect from manufacturer's full range.

## 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 the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
  2. Fiber-Cement Board: 12 percent.
  3. Masonry (Clay and CMUs): 12 percent.
  4. Wood: 15 percent.
  5. Gypsum Board: 12 percent.
  6. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems 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.
- C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

### 3.3 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

### 3.4 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Concrete Masonry Substrates:
  - 1. Epoxy System:
    - a. Prime Coat: Block filler.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, semi-gloss.

**END OF SECTION 099600**

## SECTION 102113 - PLASTIC TOILET COMPARTMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Solid-plastic toilet compartment doors.

#### 1.2 ACTION SUBMITTALS

- A. Product Data:
  - 1. Solid-plastic toilet compartment doors:
- B. Shop Drawings: For solid-plastic toilet compartment doors.
  - 1. Include plans, elevations, sections, details, and attachment details.
- C. Samples: For each type of toilet compartment material indicated.
  - 1. Include Samples of hardware and accessories involving material and color selection.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Certificates:
  - 1. Product Certificates: For each type of toilet compartment by manufacturer.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with applicable provisions in the U.S. Department of Justice "2010 ADA Standards for Accessible Design" and ICC A117.1 for toilet compartments designated as accessible.

#### 2.2 SOLID-PLASTIC TOILET COMPARTMENT DOORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:



1. ASI Global Partitions.
2. Hadrian Inc.; Zurn Industries, LLC.
3. Scranton Products.

B. Door Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.

1. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum or stainless steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
2. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range.

## 2.3 HARDWARE AND ACCESSORIES

A. Hardware and Accessories, Heavy Duty: Manufacturer's heavy-duty operating hardware and accessories.

1. Hinges: Manufacturer's minimum 0.062-inch-thick stainless steel continuous, cam type that swings to a closed or partially open position, allowing emergency access by lifting door. Mount with through bolts.
2. Latch and Keeper: Manufacturer's heavy-duty, surface-mounted, cast-stainless steel latch unit, designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Mount with through bolts.
3. Coat Hook: Manufacturer's heavy-duty combination cast-stainless steel hook and rubber-tipped bumper, sized to prevent inswinging door from hitting compartment-mounted accessories. Mount with through bolts.
4. Door Bumper: Manufacturer's heavy-duty, rubber-tipped, cast-stainless steel bumper at outswinging doors. Mount with through bolts.
5. Door Pull: Manufacturer's heavy-duty, cast-stainless steel pull at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible. Mount with through bolts.

## 2.4 MATERIALS

- A. Aluminum Castings: ASTM B26/B26M.
- B. Aluminum Extrusions: ASTM B221.
- C. Brass Castings: ASTM B584.
- D. Brass Extrusions: ASTM B455.
- E. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.
- F. Stainless Steel Castings: ASTM A743/A743M.

## 2.5 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment doors to sizes indicated.
- B. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, inswinging doors for standard toilet compartments and 34-inch-wide, outswinging doors with a minimum 32-inch-wide, clear opening for compartments designated as accessible.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF PLASTIC TOILET COMPARTMENT DOORS

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

### 3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on inswinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors to return doors to fully closed position.

**END OF SECTION 102113**

## SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Public-use washroom accessories.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: Full size, for each exposed product and for each finish specified.

#### 1.3 INFORMATIONAL SUBMITTALS CLOSEOUT SUBMITTALS

- A. Sample warranty.
- B. Maintenance data.

#### 1.4 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors 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 PUBLIC-USE WASHROOM ACCESSORIES

- A. Toilet Tissue Dispenser:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Bobrick Washroom Equipment, Inc.
    - b. Bradley Corporation.
  - 2. Configuration: Surface-mounted, twin roll.
  - 3. Material: Stainless steel, 20 gauge cabinet, 18 gauge door.
    - a. Finish: Satin.

4. Model: Bobrick B-2892 or equal.

B. Grab Bar:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. Bobrick Washroom Equipment, Inc.
  - b. Bradley Corporation.
2. Mounting: Front mounting with security fasteners.
3. Material: Stainless steel, Type 304.
  - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
4. Outside Diameter: 1-1/4 inches.
5. Configuration and Length: As indicated on Drawings and in compliance with applicable accessibility codes.
6. Product Standard: Bradley Model SA70, detention grade, or equal.

C. Mirror Unit:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. Acorn.
  - b. Bradley Corporation
2. Size: 18"w x 30"h.
3. Mounting: Tamper resistant screws through holes in mirror.
4. Product Standard: Bradley Model 748, frameless stainless steel, or equal.

D. Electric Hand Dryer:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. Excel Dryer.
2. Description: Automatic sensor operated hand dryer.
3. Mounting: Surface.
4. Material and Finish: Stainless steel, No. 4 finish (satin).
5. Electrical requirements: See Electrical Drawings.
6. Model: XLERATOR XL-SB.

E. Baby Changing Station:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. Koala

2. Description: Stainless exterior / molded plastic table liner baby changing station, Koala KB-310-SSWM.
3. Mounting: Surface.
4. Material and Finish: Stainless steel, No. 4 finish (satin), 18 gauge

## 2.2 FABRICATION

- A. 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 ASTM F 446.

**END OF SECTION 102800**

## **SECTION 104416 - FIRE EXTINGUISHERS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Accessories.
- D. All materials, labor, services, and incidentals necessary for the completion of this section of the work.

#### **1.2 REFERENCES**

- A. NFPA 10 - Standard for Portable Fire Extinguishers.
- B. UL - Fire Protection Equipment Directory.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. Conform to NFPA 10 code.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

#### **1.4 SUBMITTALS FOR REVIEW**

- A. Section 013300 - Submittals: Procedures for submittals.
- B. Shop Drawings: Indicate cabinet physical dimensions rough-in measurements for wall bracket mounted measurements, location, and height.
- C. Product Data: Provide extinguisher operational features, color and finish, and anchorage details.

#### **1.5 SUBMITTALS FOR INFORMATION**

- A. Section 013300 - Submittals: Procedures for submittals.
- B. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- C. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

#### **1.6 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Section 017700 - Contract Closeout: Procedures for submittals.

- B. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers:
  - 1. Larson
  - 2. J.L. Industries
  - 3. Substitutions: Refer to Section 012500 – Substitution Procedures.

### 2.2 FIRE EXTINGUISHERS

- A. Dry Chemical Type: Steel tank, with pressure gage; Class A:B:C, Size 10 (verify with Architect).
- B. Extinguisher Finish: Baked enamel.

### 2.3 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, chromed.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. See Section 013100 – Project Management and Coordination: Coordination and Meetings: Verification of existing conditions before starting work.

### 3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Mount extinguishers so that extinguisher handle is 48" AFF max. for accessibility.

**END OF SECTION 104416**

## SECTION 313116 - TERMITE CONTROL

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Soil treatment.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include the EPA-Registered Label for termiticide products.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.

- B. Soil Treatment Application Report: Include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Water source for application.

- C. Sample Warranties: For special warranties.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located and who employs workers trained and approved by manufacturer to install manufacturer's products.

#### 1.5 WARRANTY

- A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied soil termiticide treatment will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: Three years from date of Substantial Completion.



## PART 2 - PRODUCTS

### 2.1 SOIL TREATMENT

- A. Termiticide: EPA-Registered termiticide acceptable to authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation.
  - 1. Service Life of Treatment: Soil treatment termiticide that is effective for not less than three years against infestation of subterranean termites.
  - 2. Ensure that products and application is compatible with Owner's ongoing termite treatment and inspection contact in force for adjacent buildings.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Remove extraneous sources of wood cellulose and other edible materials, such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated.

### 3.2 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Distribute treatment uniformly. Apply treatment at the product's EPA-Registered Label volume and rate for maximum specified concentration of termiticide to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.
  - 1. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
  - 2. Foundations: Soil adjacent to and along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing.
  - 3. Masonry: Treat voids.
  - 4. Penetrations: At expansion joints, control joints, and areas where slabs and below-grade walls will be penetrated.
- B. Post warning signs in areas of application.
- C. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

## END OF SECTION 313116